HELSINKI SCHOOL OF ECONOMICS (HSE)
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DETERMINANTS AND CONSEQUENCES OF USE OF PROCEEDS DISCLOSURE IN IPO PROSPECTUSES

Evidence from NASDAQ high tech IPOs

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ABSTRACT
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DETERMINANTS AND CONSEQUENCES OF USE OF PROCEEDS DISCLOSURE IN IPO PROSPECTUSES – Evidence from NASDAQ high tech IPOs

Purpose of the thesis

This thesis examines the determinants and consequences of disclosure in IPO prospectuses of high tech companies listing on NASDAQ between January 1999 and December 2006. The two main research questions are: 1) what factors explain more specific prospectus disclosure and 2) is there evidence of benefits to companies, which disclose more specific information in their prospectus.

Data

This thesis focuses on a very narrow, but important, disclosure measure named *Specificity*. The measure is defined as the percentage of net proceeds received by the issuer that are earmarked for a specific purpose in the use of proceeds section of the prospectus. Total sample consists of 316 high tech companies that have listed on the NASDAQ between January 1999 and December 2006. Total sample is split into hot and cold sub samples based on differences in market conditions. The hot market sample includes IPOs from January 1999 to March 2000 and has 150 observations. Correspondingly, the cold market sample consists of IPOs taking place between October 2000 and December 2006 and includes 103 observations.

Research methods

The first empirical test is a tobit regression conducted to find out what factors determine use of proceeds disclosure. Secondly, the analysis turns to consequences of more specific disclosure. Here a two step OLS regression is needed to control for the endogenous links between causes of the decision to disclose and the direct impact of these causes to underpricing. This method provides better tests for the relevance of the actual decision to disclose, not the investment plans themselves.

Results

The empirical analysis finds support for the hypothesis that larger companies tend to disclose more specifically. Moreover, results suggest that profitable companies are more specific in their prospectuses than their loss-making peers. Also companies, which are more in need of the external financing as indicated by issue size scaled by sales, give more specific information about their investment plans. Results for IPOs, where the insiders retain a larger stake show the opposite: these companies are less specific about their investment plans, as expected. However, some of these results may be due to higher leverage and plans to repay debt rather than disclosure of new investments. Statistical tests show no evidence of benefits in the form of lower underpricing to companies that disclose more. Thus, no consequences for more specific disclosure are found.

Key words

Disclosure, Initial public offering (IPO), Prospectus, Use of proceeds

HELSINGIN KAUPPAKORKEAKOULU **TIIVISTELMÄ**
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Antti Niemi

LISTAUTUMISESSA NOSTETTUJEN VAROJEN KÄYTÖSTÄ TIEDOTTAMISEN SYYT JA SEURAUKSET – tutkimustuloksia NASDAQ teknologiayhtiöiden listautumisista

Tutkimuksen tavoitteet

Tutkimuksen tavoitteena on etsiä tekijät, jotka määrittävät kuinka paljon listautuvat yritykset kertovat nostettujen varojen käytöstä. Lisäksi tarkastellaan varojen käytön tiedottamisen vaikutuksia, erityisesti osakkeen hinnan käyttäytymiseen ensimmäisenä pörssikaupankäyntipäivänä. Tutkimus kohdistuu teknologiayrityksiin, jotka listautuivat NASDAQ:iin tammikuun 1999 ja joulukuun 2006 välillä.

Aineisto

Tutkimus käyttää kapeaa mutta oleellista muuttujaa, joka mittaa sen kuinka monta prosenttia listautumisessa nostetuista varoista on korvamerkitty tarkasti määriteltyihin tarkoituksiin. Koko otos koostuu 316 listalleottoesitteestä vuosilta 1999–2006. Otos on jaettu kahteen alaryhmään markkinoilla tapahtuneiden muutosten mukaisesti. Kuumaa markkinaa kuvaava otos, joka koostuu 150 havainnosta, on tammikuusta 1999 maaliskuuhun 2000 olevalta ajanjaksolta. Kylmää markkinaa vastaa otos, joka koostuu 103 havainnosta, on kerätty ajanjaksolta lokakuusta 2000 joulukuuhun 2006.

Tutkimusmenetelmät

Ensimmäisessä vaiheessa, etsittäessä tiedottamisen määrittäviä tekijöitä, käytetään tobit regressiota, joka mahdollistaa tutkittavan muuttujan rajaamisen 0 ja 1 välille. Toisessa vaiheessa käytetään tavallista OLS regressiota, johon on kuitenkin lisätty tiedottamista ennustava muuttuja ensimmäisen vaiheen regressiosta. Tämä metodi eliminoi osittain tekijät, jotka vaikuttavat päätökseen tiedottaa. Näin testit tarkastelevat paremmin itse päätöstä tiedottaa varojen käytöstä olemassa olevien investointisuunnitelmien sijaan.

Tulokset

Testien mukaan suuremmat yritykset kertovat enemmän varojen käytöstä, kuten myös kannattavat yritykset. Myös yritykset, jotka ovat enemmän riippuvaisia listautumisesta saatavasta pääomasta, ovat antaneet tarkempaa tietoa varojen käytöstä. Listautumisissa, joissa aiemmat omistajat pitävät suuremman osa osakkeista, on yleensä kerrottu vähemmän varojen käytöstä. Osa tuloksista saattaa kuitenkin johtua yhteydestä velkaisuuteen ja siitä seuraavista suunnitelmista maksaa velkaa pois. Poiketen aikaisemmasta tutkimuksesta tässä tutkimuksessa ei ilmene yhteyttä varojen käytöstä tiedottamisen ja osakekurssin kehittymisen ensimmäisenä päivänä välillä. Tämän tutkimuksen tilastolliset testit eivät löydä seurauksia rahojen käytöstä tiedottamiselle.

Avainsanat

Tiedottaminen, Listautumisanti, Listalleottoesite, Varojen käyttö

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TABLE OF CONTENT

1. INTRODUCTION

1.1. Research problem

This thesis examines the determinants and consequences of disclosure in IPO prospectuses of high tech companies listing on NASDAQ between January 1999 and December 2006. The primary objective of the research is to test the determinants and consequences of disclosure in the IPO context. Therefore, the key research questions are: 1) what factors explain more specific prospectus disclosure and 2) is there evidence of benefits to companies, which disclose more specific information in their prospectuses.

1.2. Motivation

Disclosure plays a key role in IPOs for several reasons. First, as private companies have little public disclosure, an IPO requires careful establishment of a disclosure policy as a listed company. Moreover, successful execution of the transaction itself at optimal offering price depends on investor demand for the stocks. Investor demand tends to be sensitive to the quality of information provided to the investors. Therefore, IPOs require remarkable marketing and informing effort. As Christine Comaford-Lynch writes in Business Week (November 5th 2007), the use of proceeds statement is where many deals fall apart. Need for information is obvious based on the prevalence of information asymmetry between the insiders, who are offering stocks, and investors who are buying the stocks. However, unfortunately, often the most interesting information to investors is sensitive as competitors can use it against the firm. Also legal concerns arising from the obligation to fulfil forward looking statements in the prospectus deter disclosure. The empirical tests provide answers to two key questions raised by Healy and Palepu (2001); why do firms engage in voluntary disclosure and does disclosure affect the cost of capital. More specifically the tests can be compared with the work of Leone, Rock and Willenborg (2007), who find evidence of benefits to companies that disclose more of the use of IPO proceeds. Despite the narrowness of the disclosure measure used, the measure can be justified based on its informational value and accurate measurability. The offering prospectus is the primary information source in IPOs. Although investors gain information from the road show presentations and other sources, the prospectus should include all relevant information published. More specifically, the use of proceeds section in the prospectus is one of the key concerns of investors, issuer firms, underwriters and lawyers alike.

1.3. Data and methods

Following the example of Leone, Rock and Willenborg (2007), this thesis focuses on a very narrow, but important, disclosure measure named *Specificity*. The measure is defined as the percentage of net proceeds received by the issuer that are earmarked for a specific purpose in the use of proceeds section of the prospectus. Total sample consists of 316 high tech companies that have listed on the NASDAQ between January 1999 and December 2006. Total sample is split into hot and cold sub samples based on differences in market conditions. The hot market sample includes IPOs from January 1999 to March 2000 and has 150 observations. Correspondingly, the cold market sample consists of IPOs taking place between October 2000 and December 2006 and includes 103 observations. The first empirical test is a tobit regression conducted to find out what factors determine use of proceeds disclosure. Secondly, the analysis turns to consequences of more specific disclosure. Here a two step regression is needed to control for the endogenous links between causes of the decision to disclose and the direct impact of these causes to underpricing. This method provides better tests for the relevance of the actual decision to disclose, not the real investment plans. However, the method does not completely eliminate the possibility of spurious results.

1.4. Results

The empirical analysis finds support for the hypothesis that larger companies tend to disclose more specifically. Moreover, results suggest that profitable companies are more specific in their prospectuses than their loss-making peers. Also companies, which are more in need of the external financing as indicated by issue size scaled by sales, give more specific information about their investment plans. Results for IPOs, where the insiders retain a larger stake show the opposite: these companies are less specific about their investment plans, as expected. However, contrary to expectations this thesis finds no evidence of riskier companies disclosing more in their prospectuses. In addition, the association of disclosure and firm size is much due to the association of debt repayments of larger companies. Regarding the consequences of disclosure statistical tests show no evidence of benefits in the form of lower underpricing to companies that disclose more. Thus, no consequences for more specific disclosure are found.

1.5. Related research areas

The thesis contributes to existing disclosure theory by providing more evidence on the related costs, benefits and management motives. Furthermore, it is closely related to the stream of research focusing on IPO markets and underpricing. As a part of research testing the theoretical framework for disclosure decisions, this thesis provides useful information for companies planning an IPO. Furthermore, understanding on management motives related to disclosure is essential for an investor reading an IPO prospectus.

1.6. Structure of the study

The thesis begins by providing an overview of the existing theory on disclosure costs, benefits and related management motives. The literature review also discusses prior research regarding IPO underpricing. Hypothesis are presented in section 3 followed by the empirical analysis in section 4. Section 4 begins with a description of the sample and variables and proceeds to empirical analysis of the sample. Finally, summary and conclusions can be found in section 5.

2. LITERATURE REVIEW

This thesis relates to two major research areas, namely corporate disclosure and IPO underpricing. It takes a three-step approach that begins by discussing the two areas separately and then proceeds to prior research related to IPO prospectus disclosure. The literature review ends in summary and concluding remarks of prior research knowledge. Due to the vast amount of research done on both of the main areas the literature presented covers only a small fraction of available research. Thus, the focus is on core research findings relevant for this thesis. However, where feasible, the sources providing a review discussion of their respective research area are identified, which could be useful for a researcher approaching questions related to disclosure and IPOs.

2.1. Corporate disclosure

Out of the many purposes and audiences served by corporate disclosure, the focus in this thesis is on the role of disclosure in providing value relevant information to financial markets. Healy and Palepu (2001) present a capital market framework, which highlights the parallel roles of information and capital flows in the market. In their model households inject a flow of capital to business firms, who in turn distribute information to investors in order to support their investment decisions. They also analyse the important role of intermediaries and regulators that operate and control both of these flows. Despite the ubiquity and success of this capital market macrostructure, several problems for the functionality of efficient capital allocation yet arise. Healy and Palepu summarise these issues under two main categories. First, the entrepreneurs seeking to raise capital typically have better information about the value of their business as well as incentives to overstate this value. Thus, the investors have an *information problem*. Second, once the investors have committed capital to the business ventures the entrepreneurs have the opportunity and incentives to misuse their savings, creating an *agency problem*. Informative corporate disclosure and reporting policies are one of the key remedies for these problems and hence, improve the functionality of the market as a whole. Moreover, from the perspective of a single firm operating in the market, disclosure policy can be used as a tool to attract capital at more favourable terms. Thus, in addition to legal requirements, there are capital market incentives for voluntary disclosure as well. However, discretionary disclosure decisions are also affected by several other management motives, which raise questions about their credibility and reliability for investment decisions. The following discussion on corporate disclosure proceeds by presenting the theory and empirical evidence on capital market consequences of disclosure. The theory is then completed with a discussion of agency and signalling theories in order to establish understanding of management motives for

disclosure. Thereafter this thesis reviews prior research regarding typical determinants of disclosure. Finally, the credibility of voluntary disclosure and an overview of common measures for voluntary disclosure are covered.

2.1.1. Capital market consequences of disclosure in theory

Prior research has developed several theoretical models that build a link between disclosure and cost of equity capital. In his review of the disclosure and cost of capital literature, Botosan (2006)[1] recognises two research streams that provide slightly different explanations. *Estimation risk hypothesis* suggests that inadequate disclosure leads to uncertainty over financial estimates and hence, poor understanding of the securities' return distribution. *Information asymmetry hypothesis* suggests that information asymmetry between investors causes transaction costs, which lead to higher cost of capital.

Botosan presents two main implications of the estimation risk literature that are conflicting with the traditional asset pricing theory. Firstly, academic research has developed theoretical models suggesting that investors assign a risk premium on estimation risk[2]. Second, traditional portfolio theory and equilibrium pricing models ignore estimation risk by treating the estimated parameters as if they were true. The models of estimation risk pricing are based on a framework of two investments with the same expected return but which differ in the amount of information available to the investors. The traditional CAPM treats these two investments equally in the optimal portfolio choice, whereas the estimation risk literature explicitly incorporates investors' uncertainty into the model and concludes that estimation risk should affect the asset price. Lambert, Leuz and Verrecchia (2007) provide better insight into the dilemma by building a theoretical model that is consistent with the CAPM and predicts an association between cost of capital and the quality of accounting information. Their key assumption is that the quality of accounting information has an impact on the precision of investors' estimates of covariance between cash flows of alternative investment targets. Furthermore, they argue that disclosure can have an impact on real decisions that influence the future cash flows of the firm and thus, its cost of capital. They contradict the common approach of modelling an "information risk" factor over and above market beta but remind that the use of CAPM based on historical betas is unlikely to capture all information effects on the

[1] Botosan (2006) provides a literature review of the current state of the theory and empirical evidence regarding the link between disclosure and cost of capital. Moreover, she discusses the shortcomings of current methods for measuring cost of capital and incompleteness of the understanding on how risk is priced in capital markets. Traditional portfolio theory framework and the Capital Asset Pricing Model suggest that only non-diversifiable risk is priced by investors.

[2] See Klein and Bawa (1977); Barry and Brown (1985); Coles and Loewenstein (1988); and Coles, Loewenstein and Suay (1995).

forward-looking beta. Botosan (2006), concludes that the theoretical debate on whether estimation risk can be diversified (i.e. not priced) or is non-diversifiable (i.e. priced) has not yet reached consensus. Thus, the issue remains fundamentally an empirical question as pointed out by Clarkson et al. (1996).

The empirical tests performed in this thesis do not distinguish estimation risk. Moreover, this type of risk should not be reflected in IPO underpricing as it continues to depress the share price once trading commences. However, the existence of a quoted price presumably eliminates a large fraction of information asymmetry assuming that less informed investors can discern private information from the share price (See Easley and O'Hara, 2004). Therefore, information asymmetry hypothesis is more relevant in the IPO underpricing context[3] and its theoretical basis is discussed next in more detail.

As noted above, the information asymmetry hypothesis suggests that investors pay less for stocks with higher transaction costs. Akerlof (1970) establishes a theoretical framework for the implications of adverse selection or "the lemons problem" emerging from information asymmetry. Akerlof provides an example from the market for cars, explaining the substantial price difference between new cars and old cars. In the theoretical example there are two types of cars; good ones and bad ones (lemons). A new and an old car can be either of the two and the buyer is unable to tell the difference before using the car for a length of time. Thus, the probability of a new car purchase being a lemon is equal to the proportion of lemons manufactured. However, the probability of buying a used car that turns out to be a lemon is much greater. This is because good cars and bad cars must sell at the same price as the buyers are unable to tell the difference of the two. However, the sellers know the quality of their cars and presumably are unwilling to sell a good car for a discounted price. Thus, the market for used cars should have a higher proportion of lemons than the market for new cars. Because of this used cars must be heavily discounted compared to new cars to induce buyers to take the higher risk of buying bad quality. Akerlof goes further to examine the implied consequences of dishonesty to the market. At extremes dishonesty and the lemons problem could lead to a breakdown of market functionality despite the existence of buyers and sellers that would benefit from trading. The model can also be applied to the stock market suggesting that if investors are unable to distinguish good business ideas from bad ideas they are bound to value both at an average level. Thus, good ideas would be undervalued and bad ideas overvalued. A direct implication of this is that informed investors, who are able to recognise the good and bad ideas,

[3] The literature on information asymmetry and adverse selection in IPO context are discussed under heading 2.2.1. IPO underpricing (see e.g. Rock, 1986)

would profit from trading at the expense of the less informed investors. Thus, in order to avoid losses the less informed investors are bound to require a discount to the average price.

In addition to Akerlof, a substantial body of research has hypothesised the association of higher transaction costs, information asymmetry and market illiquidity[4]. Amihud and Mendelson (1986) analyse a model in which investors with different holding periods trade assets with different relative bid-ask spreads. They find empirical support for their model prediction that market expected return is positively associated with bid-ask spreads. Correspondingly they argue that liquidity has an impact on the cost of capital and thus, policies to increase liquidity can be seen as tools to decrease the cost of capital. Furthermore, they predict a clientele effect whereby investors with longer investment horizons favour stocks with higher bid-ask spread. Glosten and Milgrom (1985) interpret the bid ask spread as a result of an adverse selection problem arising from information asymmetry between insider traders and the market maker. The market maker is concerned about the risk that traders trade on information that is not known to the market maker. Thus, they need to impose a spread between their bid and offer prices to recoup potential losses from trading with the better informed. However, Glosten and Milgrom also point out that the adverse selection does not have to be the only source of bid ask spread as the market maker also faces other costs and a profit requirement.

The role of disclosure as a remedy for information asymmetry and, more importantly, a deterrent for cost of capital is also extensively discussed in the literature. Moreover, as discussed above, the role of liquidity in asset valuation is commonly recognised (see e.g. Amihud and Mendelson, 1988). The prevailing theory is that disclosure can reduce adverse selection problems, which enhances liquidity. The lack of liquidity is a costly risk to investors and thus, a major component of the cost of capital to the company. Healy and Palepu (2001) present three well-known solutions for the lemons problem. Firstly, optimal contracts between entrepreneurs and investors will provide incentives for disclosure. Secondly, they mention regulations that require disclosure of private information, and finally, information intermediaries whose role is to uncover private information from the insiders. Diamond and Verrecchia (1991) study the causes and consequences of liquidity focusing especially on the influence of market makers and liquidity's effect on cost of capital. In general their model supports the theory that increased disclosure reduces information asymmetry,

[4] See also Demsetz (1968) and Copeland and Galai (1983)

generates liquidity and hence, reduces the cost of capital[5]. The benefits of liquidity are particularly important for large investors who want to trade large quantities of stocks. Moreover, they argue that because disclosure reduces information asymmetry, it reduces the amount of information revealed by trades of informed investors. Therefore, disclosure reduces the adverse price impact of large trades and hence, the informed investors are more willing to accumulate larger stock holdings. The higher demand from institutional investors is then reflected in the share price and hence, reduces the cost of capital. From the issuer company perspective larger companies benefit more from increased liquidity as the demand for their securities is more depended on large trades from large investors. Thus, large firms are bound to disclose more than small firms. Easley and O'Hara (2004) build a detailed model describing the market microstructure in an environment where pieces of private information are spread across investors. They use the model to examine the impact of several attributes on cost of capital: the proportion of private vs. public information, the dispersion of pieces of private information across investors and the combined precision of public and private information. Consistently with Rock's (1986) IPO model, the uninformed investors demand compensation for the expected losses from dealing with informed investors. In addition, their model suggests that more information, even if privately held, is better than no information at all. The precision of information provided by financial analysts arguably increases with the number of analysts and therefore, by attracting analysts firms can reduce their cost of capital. Easley and O'Hara's model's key implication that investors demand more of securities of which they are informed of, is consistent with the empirical evidence of home bias documented in finance literature (See e.g. Coval and Moskowitz, 1999; Grinblatt and Keloharju, 2001). It also supports the argument that more established companies find it easier and cheaper to raise money from the market. In addition, Easley and O'Hara hypothesise that uninformed investors can partially discern private information from the stock price. These specifications of the model provide remarkable implications about the interrelationship of disclosure, information asymmetry and cost of equity. If the private information is spread to a larger group of traders, the demand from the informed investors increases, which reduces the cost of capital. Moreover, the demand from the informed investors leads to higher precision of the stock price as an indicator of economic value based on the private information. This reduces the risk of misvaluation and hence, the compensation required by the uninformed investors, which further reduces the cost of capital. Based on their theoretical framework, Easley and O'Hara conclude that firms can influence their cost of capital by choosing features like accounting treatments, analyst coverage, and market microstructure.

[5] Diamond and Verrecchia also argue that if there is little information asymmetry, reducing it further would cause some market makers to exit, which would leave the large traders in a worse position and less willing to take large positions. Thus, the relationship between disclosure and cost of capital could, under these circumstances, also be positive.

Although the negative association of disclosure and information asymmetry is highly intuitive and often the underlying assumption in the literature, it is not unambiguously supported by theory and empirical evidence (Botosan, 2006; Verrecchia, 2001)[6]. An alternative to the assumption that public information displaces private information is the hypothesis that when errors in the public and private signals are sufficiently correlated public and private information complement each other (Lundholm, 1988). Moreover, it could be that informed investors are able to process the disclosed information better than less-informed investors[7]. In this case the informational advantage of informed investors would increase as a result of disclosure. Therefore, it is possible that a positive relationship between disclosure and information asymmetry exists under certain circumstances. As the theory offers no unambiguous link between disclosure and cost of capital, a review of empirical evidence is needed to determine the strength of the alternative hypothesises.

2.1.2. Empirical evidence of the impact of disclosure

Challenged by the difficulties in measuring cost of capital, the mainstream of empirical research uses proxies for transaction costs and/or information asymmetry (Botosan, 2006). The most common proxies are bid-ask spread scaled by stock price, share turnover[8] and volatility of share returns[9]. Healy, Hutton and Palepu (1999) provide empirical evidence on factors associated with increased voluntary disclosure. They use the AIMR[10] disclosure rating by financial analysts as a measure of voluntary disclosure. Based on evidence from their sample of 97 firms with a large and sustained increase in AIMR disclosure score they report that improved disclosure is associated with decline in relative bid ask spread. Furthermore, they find evidence of stock price appreciation, and increased attention from analysts and institutional investors as well as increased use of public financing. Leuz and Verrecchia (2000) test whether German companies voluntarily switching from German GAAP to USGAAP or IAS experience benefits from the higher disclosure level of the accounting standards. They find supporting evidence of increased liquidity (share turnover) and lower information asymmetry indicated by lower bid-ask spreads. Gelb and Zarown (2002) examine the relationship between corporate disclosure and the informativeness of stock prices. They also use the AIMR disclosure ratings as a measure of disclosure. Their definition of stock price informativeness is the association between current stock price return and future earnings changes.

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[6] For differing theoretical perspectives see Verrecchia (1982); Diamond (1985); Bushman (1991); Lundholm (1991); Lundholm (1988) and Kim and Verrecchia (1991 and 1994). For more discussion on this point see Botosan, Plumlee and Xie (2004).
[7] See Kim and Verrecchia, (1991) and (1994)
[8] Trading volume scaled by shares outstanding
[9] Volatility measured by statistical standard deviation of share returns
[10] Association for Investment Management and Research, renamed to CFA Institute

More informative prices are better predictors of future earnings. Gelb and Zarown find that firms with higher disclosure ratings have higher stock price associations with contemporaneous and future earnings relative to firms with low disclosure ratings. This evidence suggests that disclosure strategies affect the time needed by the market to digest the disclosed information. Moreover, the research paper provides empirical support for the widely held belief that greater disclosure provides information benefits to investors.

Albeit the empirical results on the hypothesised link between disclosure, lower information asymmetry and thus lower transaction costs appear strong, they are not definite proof due to potential weaknesses in research designs (Botosan, 2006). Bid-ask spreads are also affected by the inventory holding and order processing costs[11]. Moreover, the relative bid-ask spread[12] can decline due to rise in stock price even if information asymmetry remains constant. Firstly, stock price can rise due to diminished estimation risk as a result of disclosure. Secondly, and more distractingly, the stock price can pick up due to revisions of future cash flow estimates. Therefore, if increased disclosure is related to improving financial performance the tests of relative bid ask spread are biased. This could be the case, for instance, because managers might be more eager to disclose good news than bad news. In addition, strong performance could be related to demand for external financing, which can be associated with increased disclosure. Healy, Hutton and Palepu include contemporaneous earnings as a control variable, but this variable might not fully capture the revisions of cash flow estimates. These potential biases arising from management incentives to disclose under certain circumstances are referred in the literature as self-selection bias. As Botosan points out also the results of Leuz and Verrecchia are prone to self-selection bias. Out of their sample of German companies switching to USGAAP or IAS 86% listed on London Stock Exchange (LSE) or New York Stock Exchange (NYSE) compared to only 19% of the companies that continued with German GAAP. Therefore, the observation that adopting firms experienced higher share turnover and lower bid-ask spread could be because of a new listing status or because of the new accounting standard. Leuz and Verrecchia aim to relieve this problem by modelling the disclosure decision and controlling for self-selection bias.

Another method for examining the link between disclosure and cost of capital is to use a direct estimate for cost of equity. This method has gained ground after developments in the techniques to estimate cost of equity in the mid-90s. Botosan (1997) examines the relationship between self-

[11] Moreover, Hribar (2004) points out that the risk for a dealer is conceptually different from the risk for a long term investor. The risk for a dealer is uncertainty about the buy/sell order imbalance in an intra-day horizon. Typical investor is concerned about the stock return over a horizon of years or at least months.
[12] Relative bid-ask spread is the bid ask spread divided by the stock price

constructed disclosure scores based on annual reports, and the cost of equity capital estimates constructed using a dividend discount model. She analyses a regression of firm-specific estimates of cost of capital on market beta, firm size and the disclosure measure. Results support the hypothesis that greater disclosure is associated with a lower cost of equity capital, but the analysis is limited to manufacturing industry and the year 1990 and holds only for companies with little analyst coverage. Following Botosan's example researchers have found consistent results with different samples[13]. Botosan and Plumlee (2002) expand the finding to heavily followed firms across a broad spectrum of industries. They also examine the isolated influence of annual reports, timely disclosure and investor relations activities. The results with annual report disclosure are consistent with the earlier research. However, contrary to the theory, they find a positive relationship between cost of capital and timely disclosures, such as quarterly reports. On the other hand this result is consistent with the claims that greater timely disclosures might increase the cost of capital, possibly through increased stock price volatility. No association is found between level of investor relations activities and the cost of capital. Based on their results they conclude that aggregating across different disclosure types results in loss of information. This justifies the use of very specific disclosure measures. However, they also recommend controlling for other types of disclosure in order to avoid spurious associations leading to erroneous conclusions. The results show that conflicting conclusions of both practitioners and academic researchers regarding the association of disclosure and cost of capital may have merit.

Research on management decisions when raising capital provides prima facie evidence on whether corporate directors believe that disclosure can help to diminish the cost of capital. Choi (1973) finds strong evidence of increased voluntary disclosure before entry to the Eurobond market. Healy, Hutton and Palepu (1999) document an association between increased use of public financing and increased AIMR disclosure scores. Lang and Lundholm (2000) examine corporate disclosure activity around seasoned equity offerings. They find that six months before the offering the sample firms dramatically increased their voluntary disclosure. The disclosure behaviour tends to be the strongest for firms with shareholders selling stocks in the offering. However, there is no change in the amount of forward looking statements before the issue, which the researchers explain by litigation concerns. Results also show that companies with consistent disclosure policy experience price appreciation prior to the offering and only minor price declines at the announcement of the offering. On the other hand companies that remarkably increase disclosure in anticipation of the offering also gain in share price before the announcement of the offering, but suffer much larger

[13] See for example Richardson and Welker, 2001 (Canadian firms); Hail, 2002 (Swiss firms); Poshakwale and Courtis, 2005 (Banks)

price declines at the announcement of their intent to issue equity. Lang and Lundholm interpret the results as supportive evidence of disclosure to "hype" the stock in order to reduce the cost of capital.

The role of information intermediaries and institutional investors

In addition to proxies and measures of cost of capital itself, it is appropriate to review the empirical evidence of the role of intermediaries and institutional investors. As discussed earlier, details in market microstructure and information diffusion in financial markets can lead to remarkable changes in the consequences of disclosure (see e.g. Easley and O'Hara 2004). Research on the roles of sell-side analysts, the media, buy-side analysts and institutional investors can improve the precision of market models. Healy and Palepu (2001) point out that most of the research done is focusing on sell-side analysts. Sell-side analysts collect information from public and private sources and evaluate the performance and outlook of the companies they follow. Academic research of the sell-side analysts focuses on two easily quantifiable measures: earnings forecasts and buy/hold/sell recommendations. Empirical evidence shows that analyst recommendation changes and earnings forecast revisions affect stock prices (see e.g. Francis and Soffer, 1997). Moreover, as discussed by Healy and Palepu, overall research evidence suggests that analysts add value to the market. Their earnings estimates are superior to time-series forecast models (see Brown et al., 1987). Furthermore, Barth and Hutton (2004) find that analysts' earnings revisions provide useful information to the market. More specifically, they find strong evidence of a successful trading strategy based on combining information in accruals and analysts' earnings forecast revisions. However, research has also discovered systematic biases in analysts' forecasts and recommendations, particularly over-optimism (see Brown et al. 1985) As discussed by Healy and Palepu (2001), research focusing on the incentives of sell-side analysts has brought to the attention that analysts are rewarded for providing information that generates trading volume and investment banking fees for their brokerage houses[14]. Finally, as Core (2001) points out, the ambiguous role and influences of financial analysts in the market is determined by the interrelationships of the buy side and the sell side. However, as he continues, there is fairly little academic research on the buy side analysts and the trading processes of institutional investors. Moreover, the role of the media as a neutral information intermediary has received fairly little research attention[15]. Foster (1979, 1987) examines stock price reactions to Barrons articles by Briloff, who questioned firm's accounting choices. Foster documents average decline of 8% in the stock price of criticised firms at the time of

[14] See Lin and McNichols, 1998; Dechow, Hutton and Sloan, 2000

[15] Bushman, Piotroski and Smith (2003) examine corporate transparency on a country level. They find a positive association between information systems that are assumed to contribute to corporate transparency. These systems include high-quality financial reporting, financial analysts, institutional investors, and well developed media channels.

the release of the article. These results show that the media can have a powerful impact on the stock market. Overall the evidence supports the common belief that the media and analysts enhance liquidity, reduce information asymmetry and, hence, the cost of capital.

Disclosure's association with information intermediaries and institutional owners

As discussed above information intermediaries and institutional investors play a crucial role in information circulation and, moreover, in attracting investor interest. Thus, if disclosure has an impact on the attention from analysts and institutional investors, it can also have indirect consequences for liquidity and cost of capital. Theory suggests that voluntary disclosure has an impact on the demand and supply of financial analyst services. According to Bhushan (1989) and Lang and Lundholm (1996) increased disclosure may lower the cost of collecting information and, thus, contribute to analysts' willingness to follow the company. On the other hand the shift in the balance of public and private information should decrease the need for financial analysts as more of the information is available to the public. Lang and Lundholm examine analyst ratings of corporate disclosure policy provided in the AIMR reports[16]. Their empirical evidence suggests a positive relationship between increased disclosure and analyst following. Thus, they conclude that analyst services are not in direct competition with direct corporate disclosure to investors. Moreover, they find that firms with more informative disclosure have also less dispersion in analyst estimates, more accurate forecasts, and less volatility in forecast revisions. However, based on the importance of investor relations, the results suggest that analysts' primary source of information is direct contact with the companies. The researchers interpret the results as indirect evidence of the cost of capital benefits of disclosure. They argue that companies that disclose more have a larger pool of potential investors and less information asymmetry as well as estimation risk. This is highly consistent with the results of Healy, Hutton and Palepu (1999), who find that increases in disclosure are associated with increases in institutional ownership as well as liquidity. Moreover, Tasker (1998) finds that firms with more analyst following and institutional ownership are more likely to have conference calls. These findings support the intuition that disclosure could have positive feedback effects as it attracts intermediaries, who reduce information asymmetry, which then again attracts more investors and, presumably, more intermediaries to serve these investors. The force of this positive feedback loop is probably maximised when it is supported by strong financial performance and/or growth prospects.

[16] At the time AIMR was called the Financial Analyst Federation (FAF). Currently it is named CFA institute.

2.1.3. Agency theory and accounting

Agency problems appear when the management responsibility of assets or projects is delegated to an agent and the principal steps back and hence, has limited monitoring ability. If the agent's incentives are not in line with the principal's, these situations involve the risk that the agent operates against the principal's best interest to benefit himself. The problem arising from limited monitoring ability is referred in the literature as *moral hazard.* Jensen and Meckling (1976) introduce agency theory into the corporate governance and corporate finance framework. They identify three types of *agency costs.* Firstly, the principal faces monitoring costs from the setup and operation of reporting and governance mechanisms that mitigate moral hazard problems. Secondly, the agent might expend resources (i.e. *bonding costs*) to guarantee that he will not take certain actions that would harm the principal or to ensure that the principal would be compensated for the damage of such actions. Thirdly, despite careful contract design, some extent of suboptimal behaviour by the agent can be assumed in most principal-agent relationships. Lambert (2001) reviews agency theory in the accounting context and addresses several implications thereof. The conflicts of interest, incentive problems and mechanisms of controlling these problems are at the core of financial reporting theory and the motivation for accounting and auditing. He points out two fundamental questions addressed in the accounting literature. First, how do features of information, accounting and compensation systems affect incentive problems and second, how does the existence of incentive problems affect the design and structure of information, accounting and compensation systems. Typical reasons for conflicts of interest include effort aversion by the agent, diversion of principal's resources to the agent's private consumption, differential time horizons (e.g. the agent is less concerned about the long-term effects of his current actions) and differential attitude to risk on the part of the agent. Agency theory is further discussed in the IPO section of the literature review, where it is presented to explain why underpricing occurs.

2.1.4. Signalling theory

Signalling theory studies communication between individuals belonging to two groups: senders and receivers. The senders are trying to persuade the receivers to commit resources to mutual projects, but need to justify that the investment is productive for the receiver. Spence (1973) initiated the research on this branch of contract theory by developing a model where, employees (senders) signal their skills by investing in a certain level of education, which is costly to them. Employers (receivers) will prefer highly educated employees as high education is a signal of high abilities because the cost of completing studies is lower for more capable people. For the theoretical model to work it is not necessary that education has any intrinsic value as long as it is costly for the

employee to acquire and carries information about the employee to the employer. Corporate disclosure can be seen as a setting where managers (senders) try to raise capital from investors (receivers). The investors face the problem of finding good investment targets from a group of companies including both good and bad businesses. Thus, they have to distinguish good and bad companies based on the actions and communication from the managers. Signals can be categorised as direct and indirect signals. For instance, dividend policy could be an indirect signal of the firm's future cash flows and, hence, value of the shares (see e.g. Miller and Rock 1985). According to the theory, honest signals are ones that are costly enough to make them uneconomical to produce if the true level of quality is less than indicated. Hughes (1986) presents a signalling model, where a firm's direct disclosure is perceived as a credible signal due to contingent contracts penalising for outcomes considered low relative to the disclosed value.

2.1.5. Management motives for voluntary disclosure

As Healy and Palepu (2001) argue, managers face tradeoffs between fully transparent communication of their best information to investors and managing reported performance for contracting, political or corporate governance reasons. Thus, the management motives and the credibility of their disclosures should be reviewed when examining voluntary disclosure and its impact on capital markets. Healy and Palepu find six forces that affect managers' disclosure decisions: capital market transactions, corporate control contests, stock based compensation, litigation, proprietary costs and management talent signalling. I categorise the three first of the motives as capital market incentives as they are related to management incentives to maximise the share price. Moreover, political costs of disclosure arising from the risk of political intervention against the company have been identified by earlier research (see e.g. Watts and Zimmerman, 1978). In addition to these motives, Hooghiemstra (2000) argues that corporate image and corporate identity are relevant in disclosure decisions, which, together with political costs, explains voluntary social reporting.

Capital market incentives

As Myers and Majluf (1984) point out managers planning to issue public equity or debt should take care not to issue them undervalued. Thus, if the market fails to perceive positive information that the management has they should communicate the good news in order reach a fair valuation for the securities to be issued. The same applies for acquisitions financed by a stock transition. If the transaction is done by selling undervalued securities the existing shareholders lose value. Furthermore, a consistently informative disclosure policy is presumably the best practice for

reducing information asymmetry and, hence, maximising share price in a fair manner. The empirical evidence of increased disclosure preceding seasoned equity offerings (Lang and Lundholm, 2000) is consistent with these assumptions.

Shareholders and boards of directors hold managers accountable for stock performance as the management should aim to maximise shareholder wealth. Thus, the link between CEO turnover and poor stock price performance found by Warner, Watts and Wruck (1988), is hardly surprising. Moreover, poor stock price performance is associated with the probability of a hostile takeover, which usually leads to changes in the management team (see Palepu, 1986). Thus, in order to avoid career setbacks, managers are expected to use voluntary disclosure to avoid undervaluation and explain away poor earnings. Brennan (1999) finds empirical evidence of increased tendency of acquisition targets to give management earnings forecasts during contested takeover bids.

Stock-based compensation plans have become the standard in listed companies, especially in the U.S. These mechanisms create several incentives for the managers to disclose information to capital markets (Healy and Palepu, 2001). Firstly, because of insider trading rules the management should disclose value relevant information before trading their stock holdings. Furthermore, increased disclosure can generate liquidity, which is needed to efficiently execute larger transactions. Also stock option expiration dates provide a strong incentive to correct any perceived undervaluation. Secondly, the cost of compensation to new employees depends on stock valuation. Employees and, especially managers, participating in stock-based compensation programmes are concerned about the risk of misvaluation. To compensate for this risk they are assumed to insist more compensation, presumably in cash. This extra cost of compensation can be mitigated by decreasing the chance of misvaluation by more informative disclosure practices. Empirical evidence supporting the association between stock-based compensation and voluntary disclosure is robust. Noe (1999) investigates the association between voluntary disclosure of earnings forecasts and insider trading. He finds no evidence of managers taking advantage of the news before they are disclosed. However, managers use other tactics to exploit private information. They cluster their transactions after the disclosures that result in more favourable prices for them. In addition, he argues that managers take advantage of their information of the long term performance of the company and protect themselves against allegations by voluntary disclosures of earnings forecasts. Aboody and Kasznik (2000) examine stock option award periods and find evidence of managers making disclosure decisions to increase their stock-based compensation.

Litigation costs

The role of litigation risk is emphasised in the IPO prospectus due to the large economic consequences of its purpose, the stock transaction. The threat of facing legal prosecution from shareholders can have two sided effects on management disclosure decisions (Healy and Palepu, 2001). On one hand disclosure can protect the issuer and management from allegations of inadequate disclosure. The implications of this are best perceived in the emphasised role of risk factors in the prospectus. Risks are usually discussed right after the summary section and the issuer, together with underwriters and lawyers, makes sure that the list is inclusive. On the other hand voluntary disclosure of targets or estimates can lead to problems if it later appears that the targets are not reached. Despite the thorough use of disclaimers and the possibility to give stipulations, the managers are hesitant to give tangible forward looking statements. One good example of this is the dividend policy statement of the prospectus, where the standard seems to be that the company does not commit to any dividend payments[17]. Healy and Palepu assume that managers believe that the legal system penalises for forecasts made in good faith because it cannot efficiently distinguish between unexpected forecast errors due to chance and those due to deliberate management bias. Empirical research on earnings pre-announcements provides mixed evidence. Skinner (1994, 1997) finds that firms with bad earnings news are more than twice as likely to give a pre-announcement as are firms with positive news. Moreover, firms with negative news are also more likely to be subject to litigation. Skinner reports weak evidence that litigation costs are lower for firms that pre-disclose than for those that do not. Francis, Philbrick and Schipper (1994) examine litigation risk and disclosure by comparing two samples; a litigation sample containing companies that were sued by shareholders and; at-risk sample containing companies with comparable earnings declines[18]. Out of the 53 companies in the at-risk sample only one was sued. The researchers find that 62% of firms in the litigation sample were sued over earnings forecasts or pre-emptive earnings disclosures. On the other hand 87% of their at-risk sample did not pre-announce. They conclude that pre-disclosure does not appear to be a deterrent to litigation. However, the researchers point out, that the company size in the litigation sample is about tenfold the company size in the at-risk sample. Thus, as Core (2001) suggests, an alternative interpretation of the evidence is that larger firms expect to get sued more likely and hence, disclose more in order to mitigate the litigation risk.

[17] None of the sample companies committed to dividend payments in the prospectus

[18] The average quarterly EPS (before extraordinary items) decline compared to previous quarter is -122% for the at-risk sample and -76% for the litigation sample. The quarterly EPS declines against previous year are -145% and -107%, respectively.

Proprietary costs

A vast amount of researchers hypothesise that decisions to disclose are affected by potential damage on the competitiveness of the company in its product market[19]. Verrecchia (2001) and Dye (2001) provide a discussion of the proprietary cost literature. The research papers conclude that managers have an incentive not to disclose information that will harm their competitive position, even if the disclosure would reduce the costs of raising new capital. It should be noted also that existing shareholders would lose even more if the equity market understands the harm done by the disclosure and adjusts its valuation of the stock accordingly. The proprietary cost incentive is sensitive to the nature of competition in the industry and firm characteristics. High tech companies are presumably highly vulnerable to proprietary costs due to the information intensiveness of their products themselves. The important role of intangible assets and low need for tangible assets in the business emphasises the high risk of information leakages to competitors. Guo, Lev and Zhou (2004) find robust empirical evidence of proprietary cost incentive in their examination of product-related information in the IPO prospectuses of biotech companies.

Political costs

Watts and Zimmerman (1978) argue that as the political sector has the power to affect wealth transfers between various stakeholders, the managers and shareholders have an incentive not to disclose information that might lead to political intervention against them. Political costs are highly correlated with firm size. Siegfried (1975) shows a logical association between firm size and anti-trust. For more empirical evidence of the political cost hypothesis see for example Han and Wang (1998), who examine earnings management of oil companies during the 1990 Persian Gulf crisis.

Management talent signalling

Trueman (1986) argues that talented managers have an incentive to make voluntary earnings forecasts to reveal their foresight and ability make the right conclusions about the business. Investors highly appreciate companies that have a good management team in place to anticipate and react to changes in the business environment. Thus, by showing their ability to forecast the business the management can make the company more attractive to investors and, hence, maximise the market value of the firm. This hypothesis appears valid, but to my knowledge has not been rigorously empirically tested due to problems in research design.

[19] See Verrecchia, 1983; Darrough and Stoughton, 1990; Wagenhofer, 1990; Feltham and Xie, 1992; Newman and Sansing, 1993; Darrough, 1993 and Gigler, 1994.

Public goodwill

Hooghiemstra (2000) brings forward the argument that corporate social reporting is not motivated by mere legitimacy justifications against public pressure but also by the need to enhance corporate image and identity. Company reputation can have a huge impact on the business in all fronts with various stakeholders. Murray et. al. (2006) find some evidence that shares of companies with consistently higher level of social and environmental disclosure over perform in the long run. However, they are careful about making the conclusion that investors care about this kind of disclosure.

2.1.6. Determinants of voluntary disclosure

Raffournier (1995) examines the determinants of disclosure focusing on the annual reports of Swiss listed companies. He measures the extent of disclosure by an index based on information whose disclosure is required by the Fourth and Seventh EU Directives. He hypothesises that company size, leverage, profitability, ownership structure, internationality, auditor's size, percentage of fixed assets and industry type are potential determinants of disclosure. The main result is that larger and more international companies tend to disclose more information compared to their smaller and more local peers.

Company size

According to Raffournier, accounting literature in general finds three reasons why company size is positively associated with disclosure. First, larger companies might have more advanced internal reporting procedures, which make it easier for them to produce information to be disclosed. Secondly, because smaller companies might be more reluctant to disclose information to their competitors, as they are more vulnerable to competition than larger companies. Thirdly, according to Watts and Zimmerman (1978), larger companies may be more affected by political costs and thus want to disclose more to avoid public criticism or government intervention into their affairs.

Profitability

Raffournier argues that the influence of profitability on disclosure is obvious. When the rate of return is high managers are motivated to disclose detailed information in order to support the continuance of their position and remuneration. Inversely, when the rate of return is low, they may disclose less information in order to conceal the reasons for bad financial performance. However, according to him empirical evidence to support this association is weak.

Ownership structure

Raffournier hypothesises that the more dispersed the ownership structure the more there are agency costs, which lead to higher need for more informative reporting policies. Based on the agency theory when the company is controlled by few major shareholders there are less concerns of conflict of interest compared to companies with managers as minor shareholders and the rest of the shares owned by a large and disperse group of investors. In the latter case, closer monitoring and reporting may help to convince the public investors that the company is run according to their best interest.

Need for external financing and leverage

Raffournier also argues that disclosure can contribute to solve monitoring problems between stockholders and creditors. These problems are naturally more likely to arise in more leveraged companies. Thus, a positive relationship between leverage and disclosure can be expected. Moreover, as discussed previously under heading 2.1.7 "empirical evidence of the impact of disclosure", there is plenty of evidence of increased disclosure when raising new capital from the financial markets.

2.1.7. Credibility of voluntary disclosure

In order for disclosure to be useful for investment decisions it needs to be value relevant and credible. Because managers have other incentives than avoiding misvaluation of the stock it is questionable whether voluntary disclosures are credible. Healy and Palepu (2001) discuss two mechanisms for increasing the credibility of voluntary disclosures. Firstly, third-party intermediaries can provide assurance about the quality of management disclosures. Secondly, there can be validation of prior voluntary disclosures through required financial reporting itself. For example management's financial estimates and guidance can be verified using actual realisations. The efficiency of this mechanism requires that there are sufficient penalties for deliberate misleading. Corporate governance and legal system play a key role here, but it should also be noted that equity investors are bound to withdraw their investments from a company run by managers' who have deliberately misled them.

The empirical evidence on market reactions to voluntary disclosure supports the assumption that voluntary disclosure is credible. Pownall and Waymire (1989) find that the market reaction to unexpected management earnings forecasts is similar in magnitude to the reaction to unexpected earnings announcements themselves. This implies that management forecasts have comparable credibility to audited financial information. There is also evidence that management forecasts give

new valuable information to the market. The management forecasts are found to be more accurate than contemporaneous analyst estimates (see Hassell and Jennings, 1986; Waymire, 1986), and, unlike analyst estimates, they are unbiased (McNichols, 1989). Amir and Lev (1996) examine non-financial information in the wireless communication sector and find that voluntary disclosures such as market population size and market penetration have a more significant impact on stock prices than required financial statements. Thus, the empirical evidence strongly supports the hypothesis that voluntary public disclosures by the management are credible. It can be argued that the costs of dishonesty and control systems imposed to management are effective in mitigating management biases.

2.2. *Initial Public Offerings*

IPOs have received much attention in the academic research[20] and in the media based on the unique research approaches to financial market theory as well as their economic relevance. This thesis contributes to the earlier research by providing some further insight into a widely documented, yet ambiguous, phenomenon referred as IPO underpricing. Prior research on IPOs is discussed here in two parts. The review begins with the hypothesised explanations for underpricing and, continues with a discussion of IPO cycles in order to provide the necessary background information for the comparison of two time periods. Moreover, empirical evidence shows that underpricing is particularly high in periods described as "hot IPO markets", which suggests that the same forces that drive IPO volume also affect underpricing. Ritter and Welch (2002) reach the same conclusion and recognise the need for time-variation research regarding IPO phenomena, which has contributed to the research design employed in this thesis.

2.2.1. IPO underpricing

Considerable body of evidence exists to document the fact that on average IPOs are underpriced as measured by the difference between the offer price and closing price on the first day of trading. The phenomenon has high economic relevance and has persisted over time. Loughran and Ritter (2002) document over $27 billion "left on the table" during 1990-1998 in the U.S. alone. According to them the $27 billion amounts to twice the investment banker fees paid by the issuing companies. Moreover, the sum is more than three times the aggregate of $8 billion generated in profits by the IPO companies in the year before going public. But the statistics from early nineties look like pocket money compared to the astonishing first day run-ups in 1999 and 2000. Ritter[21] illustrates

[20] For a review of academic literature on IPOs see Ritter and Welch (2002)

[21] See Professor Jay Ritter's webpages *http://bear.cba.ufl.edu/ritter/ipodata.htm*, document named "money left on the table"

this by ranking the IPOs by dollar amount left on the table. The list ends to Netscape Communications on 173rd place, a share that still doubled in price on the first day of trading. Out of these 173 IPOs, 143 took place in 1999 or 2000. More outrageously, the total dollar amount left on the table by these 143 IPOs alone amounts to over $47 billion. Moreover, Ritter's data[22] shows average first day run-up of 71% and 56% for years 1999 and 2000, respectively.

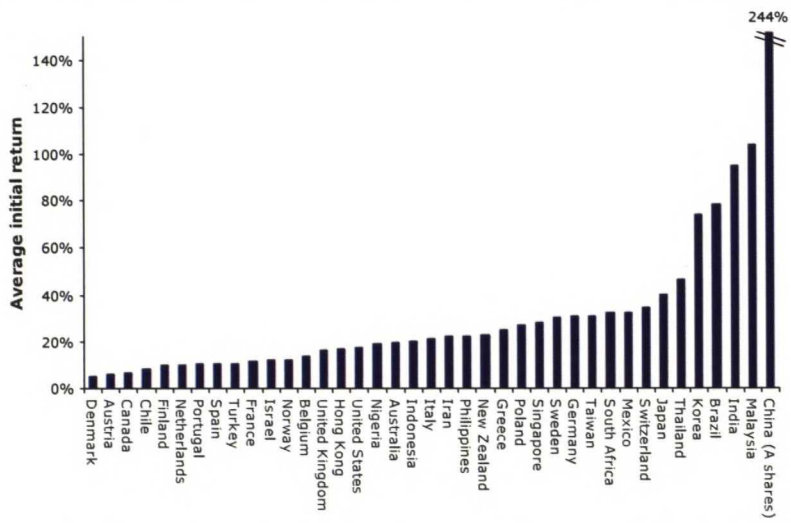
Since underpricing was first documented in the late 70s (e.g. Ibbotson and Jaffe, 1975; Ritter, 1984), researchers have developed and tested several hypothesis to explain the phenomenon (see Ritter and Welch, 2002 for a literature review)[23]. The *adverse selection hypothesis* is the most traditional explanation for underpricing. Rock (1986), a pioneering researcher of the adverse selection hypothesis, introduces the Akerlof's (1970) "lemons problem" into the IPO context. Since the publishing of Rock's paper explanations for average initial returns have grown more diverse. But, despite the research efforts, the literature is yet in the process of formulating a consistent theory. Particularly puzzling are the changes in underpricing levels that have occurred over time, especially the "hot market" of 1999-2000 described previously. Thus, recent research has focused on agency theoretic and behavioural finance explanations, as encouraged by Ritter and Welch (2002). Motivated by prior research the aim of this thesis is to provide better understanding of the relative importance of parallel explanations under different market conditions. This thesis categorises the explanations from prior literature under five groups; *capital market motives*, *principal-agent models, practical reasons, marketing externalities* and *behavioural finance*. The following provides a brief review of these explanations. Moreover, theoretical understanding on which of them are linked to corporate disclosure and, how disclosure could ameliorate underpricing, must be established. Without this understanding it is impossible to formulate valid hypothesis and interpret the results regarding the association between disclosure and underpricing.

Finally, before moving on to discuss the explanations for IPO underpricing, it is necessary to make a conceptual remark regarding "underpricing". Although it is the established name for the phenomenon of average first day run-up in share price, it is good to keep in mind that the price run-up is not necessary deliberate by the issuer. Although the underwriter, who works as an agent of the issuer, should have fairly accurate information of market demand for the share, there is still a degree of uncertainty over the trading price. On the other hand, the lack of perfect information forces the issuer to be cautious in the pricing as a too high issue price could jeopardise the formation of a

[22] See webpage above, document named "IPO market 2006"
[23] For a review of the theories explaining underpricing see also Loughran and Ritter (2002)

functional secondary market. In the following, the explanations for underpricing are discussed following the framework based on five categories.

Figure 2.1. Average initial returns on IPOs in selected countries



The differences in average underpricing across countries reflect the influence of institutional environment and market structure. In a broader perspective, differences in the stage of economic development of countries seem to explain underpricing levels to some extent.

Source: Ritter's website: http://bear.cba.ufl.edu/ritter/ipodata.htm colleted from various research papers by Ritter
The data is also published in Ritter (2003), European Financial Management Vol.9, No. 4., pages 423-424

2.2.1.1. Capital market motives

This thesis classifies explanations that are based on information asymmetry as capital market motives. The most obvious information asymmetry in an IPO is between the issuer and investors. The issuer has superior information about the prospects of the business and hence, the fundamental value of the share. Moreover, in the bookbuilding process the underwriter obtains fairly precise demand information that can be used to determine the market price. Thus, individual investors are disadvantaged from the informational perspective and could be concerned that the inferior information results in their loss. In other words participating in an IPO is seen as a riskier investment than buying stocks in a publicly traded company and this risk needs to be compensated for in the issue price. On the other hand, the certification role of the investment bank overcomes the issuers' motivation to over price their shares. The following explanations build on the information risk hypothesis presented previously. Moreover, they examine the possibilities of alternative asymmetric relationships regarding information.

Adverse selection and the winner's curse

The earliest theories explain IPO underpricing by adverse selection (e.g. Rock 1986). The theory is based on the argument that information asymmetry is a severe problem in IPOs. Rock's model of IPO pricing makes a distinction between informed investors and uninformed investors. The informed investors know the market and have done a thorough fundamental analysis of the company and its prospects. Thus, they have reasonably good valuation estimates for the share. Based on this information they are able to assess the attractiveness of an IPO and subscribe heavily the attractively priced IPOs and stay away from the less attractive ones. The uninformed investors lack this ability and thus, subscribe both good and bad IPOs with equal weights. However, at the allocation of good IPOs they receive lower stakes than at the allocation of the bad IPOs due to missing demand from the informed investors[24]. Therefore, if IPOs were not on average underpriced the uninformed investors would quickly notice their losses on IPO investments and not participate in IPOs anymore. Rock ends up with the argument that in order to induce demand from the uninformed investors the IPOs must be, on average, underpriced.

The "academic view"

Later information based explanations differ from the winner's curse hypothesis regarding the assumptions on the asymmetrical relationships between the parties involved. Benveniste and Spindt (1989) argue that in the bookbuilding process the underwriter gains valuable pricing information from the informed investors. Also Rock (1986) notes that, even though the issuer and underwriter are the best informed individuals, their knowledge is still inferior to the collective body of informed investors. Benveniste and Spindt build a model of the IPO marketing process, and show how it implies that underpricing should emerge. They argue that the informed investors need incentives to reveal their positive information because they can expect to benefit from keeping it to themselves. Assuming that without their information the underwriter would have to set the issue price lower, they could purchase the stock at a discount price and sell it at a full information price after the IPO. Thus, by suitably choosing the rule relating the offer price and stock allocation to investors' indications of interest, an underwriter can induce the informed investors to reveal their information. Ritter (2003) calls this the *"academic view"* as it has become very popular in academic research.

Signalling theory

As discussed, it is apparent that the issuer and underwriter have superior information to investors. Moreover, the issuer has an incentive to maximise the offer price. Thus, the investors might be

[24] In auction theory the problem of overpaying due to better informed competing bidders is referred as the *winner's curse*.

worried that this information asymmetry results in their loss. As suggested by signalling theory, asymmetric information can be reduced by giving signals of the inside information to the capital markets. Allen and Faulhaber (1989) argue that underpricing can be used as a signal to communicate that the company is of high quality. The signal can be assumed honest because only if the insiders are confident that the business will be valuable in the future they are willing to sacrifice a high cost for the success of the IPO. Only if the IPO and the company are successful the insiders will get the opportunity to recoup the cost in the secondary market. Therefore, underpricing could give a strong signal that the insiders believe in the company in the long run.

The "pitchbook view"

The underwriters as well as issuers have high incentives to create a well-functioning and liquid secondary market for the share. One of the main tools used for optimising the secondary market conditions is the allocation of the shares. The underwriter aims for a dispersed shareholder base with high share of long term owners for the company in order to minimise the stock price sensitivity to bad news[25]. Ritter (2003) refers to this hypothesis as the "*pitchbook view*" as it is commonly found in underwriters' marketing presentations to clients. Booth and Chua (1996) build a framework, where the issuer's demand for ownership dispersion motivates oversubscription and underpricing. They argue that underpricing is linked to better liquidity in secondary markets as a result of broader ownership. In the bookbuilding the underwriter aims to get subscriptions for an amount of shares several times larger than the issue size. This oversubscription provides better basis for allocation as a tool to optimise secondary market conditions. However, only part of the subscriptions is from high quality investors that are needed for the allocation. Thus, in order to fill the need the underwriter has to price the issue somewhat lower than if allocation did not matter. On the other hand the optimisation of secondary market conditions contributes to the attractiveness of the stock and hence, issue proceeds. Booth and Chua find empirical evidence of a link[26] between information costs and underpricing by examining proxies for information costs, such as underwriter

[25] It should be noted that in order to have sufficient liquidity for the stock, the ownership should be dispersed. Thus, the list of owners should include some volume traders as well. However, in practice the underwriter generally faces a shortage of investors who are committed to hold the stock. Moreover, the underwriter penalises "flippers" who sell the shares allocated to them shortly after the IPO. Flippers are highly disadvantaged in the allocation of forthcoming IPOs.

[26] For further empirical evidence of the association of underpricing and proxies for uncertainty including firm age, offering size and the number of uses of proceeds see Beatty and Ritter (1986) and Ritter (1991). Underpricing is also negatively associated with costly devices to communicate the company quality to investors, for instance underwriter and auditor quality (Carter, Dark and Singh, 1998; Beatty 1989). Moreover, managerial retained ownership may serve as a signal of firm value and thus increase valuation by reducing uncertainty (See Downes and Heinkel, 1982; Clarkson, Dontoh, Richardson, and Sefcik, 1991). The robust evidence of costly devices to mitigate information asymmetry strongly suggests that issuers are concerned about information costs.

prestige[27], company size, offer price and IPO volume. They interpret the results as support for the hypothesis that underpricing is a positive function of ownership dispersion in the presence of costly information.

Moreover, investment bankers promote the *analyst lust hypothesis*, which means that analyst coverage of the company is crucial for the secondary market success of the company (see Loughran and Ritter, 2004). Chemmanur (1993) hypothesises that underpricing can be used as a device to induce information production about the company at the time of the IPO. Good companies are willing to use this device because it helps them to stand out from the bad companies and thus, benefits them as a higher secondary market valuation. Rajan and Servaes (1997) provide empirical evidence of underpricing to induce information production. They document a relationship between underpricing and subsequent analyst following of the company, and come to the conclusion that underpricing is at least partly a cost paid for analyst interest.

2.2.1.2. Principal-agent models

Several researchers have presented the hypothesis that conflicts of interest between the underwriter and issuer could result in underpricing as the underwriter has a strong role in the pricing. As noted by Ljungqvist and Wilhelm (2003) the issuer has two ways to mitigate the agency conflicts: they can realign incentives with contract design or monitor underwriters' marketing effort and pricing behaviour directly. The first way, incentives based contract design, is basically ubiquitously in use. Moreover, it can be argued that based on continuous reporting the principal has a good oversight on the progress made throughout the IPO process. However, Loughran and Ritter (2002) argue that investment banks have two motives to underprice. Firstly, a lower price will make the issue easier to sell and thus, save their marketing costs. Secondly, they argue that investors will engage in rent-seeking behaviour to improve their priority for being allocated shares in hot IPOs. They argue that one way of doing this is by overpaying for brokerage commissions[28]. Thus, the bank would profit from underpricing through its brokerage business even when its corporate finance fees are dependent on the issue price. Ritter (2003) names this the "*profit sharing view*" of IPO allocation. However, this hypothesis requires an explanation of why the investment bank prefers to use a relatively inefficient mechanism to collect revenue as the majority of the cost of underpricing goes to the investors. Loughran and Ritter (2002) assume that issuers treat the opportunity cost of leaving

[27] As noted by Ljungqvist, Nanda and Singh (2006) the empirical evidence regarding underpricing and underwriter prestige is mixed.

[28] In a Wall Street Journal article on SEC probe of mutual funds overpaying brokerage commissions, Lucchetti (1999) states: "Other fund executives point out that higher commissions can be justified by the brokerage firms' stock and economic research, as well as the access it can provide to initial public stock offerings".

money on the table as less important than direct fees. Thus, bargaining the issuer price lower is easier than asking for more direct fees.

Figure 2.2. Potential conflicts of interest in an IPO

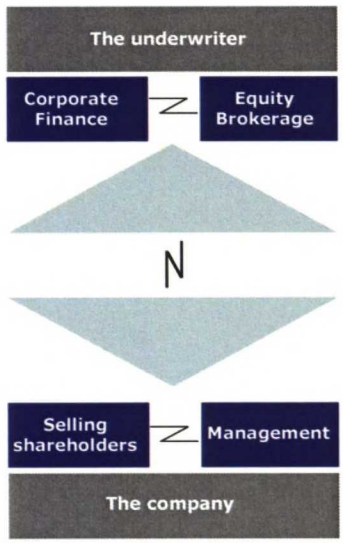


Figure 2.2 illustrates the relationship between the underwriter and issuer by showing four parties that take part in the IPO process. This provides better insight into the potential conflicts of interest in an IPO. Contract design, monitoring as well as incentives for a mutually profitable long-term relationship diminish the risk of parties acting against the best interest of the principal.

On the other hand, as illustrated by Figure 2.2., there are potential internal agency problems at the issuer. Although the IPO company management usually has substantial shareholdings before the IPO, this is not always the case. Moreover, the management might not be selling their shares in the IPO. Ljungqvist and Wilhelm (2003) document profound changes in the incentives to control the agency conflict between issuers and underwriters among the IPOs of 1999 and 2000. These changes relate to the management incentives to bargain for a high issue price and hence, could partially explain why the excessive first day price run-ups in the high tech boom were allowed to happen. For example, in 1996, pre-IPO insider ownership stakes averaged 64%, but by 2000, this had declined to 52%. CEO stakes declined even more dramatically, halving from 23% to 12%. Moreover, the ownership of IPO companies became more fragmented in the late nineties. IPOs in 1999 and 2000 were also exceptional because of the low frequency and magnitude of secondary sales in this period. Finally, "directed share programmes" to family, friends, employees, suppliers and venture capitalists, which provide the opportunity to purchase shares at *the issue price,* became more popular. As Loughran and Ritter (2004)[29] point out, the allocations of hot IPOs to personal brokerage accounts of the issuing firm executives and employees (and their family and friends) create an incentive to seek rather than avoid underwriters with a reputation for severe underpricing.

2.2.1.3. Practical reasons

There are some practical issues in the IPO process that could explain the average underpricing perceived in the statistics. This thesis briefly discusses two such explanations, namely litigation risk and price stabilisation.

[29] Loughran and Ritter (2004) explore the reasons behind changes in underpricing levels. Two out of their three hypothesis lean on agency theoretic explanations on changes in incentives and bargaining power.

Litigation risk

In the aftermath of the exposed corporate scandals and the collapse of the IT boom the regulatory environment in the U.S financial markets has become more stringent. Due to Sarbanes-Oxley and more rigorous SEC supervision it is apparent that litigation risk for issuers has increased in recent years. In the U.S. the amount of damage increases in the difference between the offering price and the subsequent, lower, market price. Thus, underpricing could reduce the potential legal liability. However, evidence from countries[30], where the probability of litigation is lower, still shows comparable underpricing. The empirical evidence from the U.S. provides no unambiguous conclusion. Drake and Vetsuypens (1993) find that the probability of being sued is not greater, the lower the underpricing, while Lowry and Shu (2002) find that it does and that greater litigation risk requires greater underpricing to insure against a lawsuit. To conclude, litigation risk could be a second order rationale for underpricing, but the market success of the flotation is by far more relevant reason.

Price stabilisation

The underwriter is allowed to provide aftermarket stabilisation to the stock price by buying the stock if its price falls below the offer price[31]. The stabilisation should effectively diminish the risk that the share price declines right after the IPO. In other words, successful stabilisation intervention truncates the lower tail of the distribution of first day stock return, turning what would otherwise have been evidence of overpricing in to an observation of zero. Thus, even if IPOs are not underpriced on average, data that reflects stabilisation will inevitably show average positive first day returns.

2.2.1.4. Marketing externalities

Public attention could be a rationale for the issuers to underprice. One explanation for the incredible underpricing of internet companies in 1999 and 2000 is that high visibility can serve a marketing purpose for the company's potential customers, employees and other stakeholders (Ljungqvist and Wilhelm, 2003). Anecdotal evidence of the enhanced image and publicity motivation is easy to find in the press as well as in IPO prospectuses. For instance, many of the high tech companies included

[30] For instance Finland, Germany, Japan, Sweden, Switzerland and the UK

[31] The mechanism for this is that the underwriter over allots stock and is left with a short position at the IPO date. In case the share price appreciates, as desirable, the underwriter executes an over allotment option (greenshoe), that is has from the issuer. If share price declines below the issue price the underwriter executes stabilisation by purchasing the shares from the market (usually at the offer price). This measure is needed to ensure favorable secondary market conditions and is permitted by SEC as it "promotes the interests of shareholders, underwriters and issuers" (SEC release No. 34-38067, p. 81)

in the sample of this thesis state increased visibility in the marketplace as one of the principal purposes for the offering. Demers and Lewellen (2003) provide more robust evidence for the marketing role hypothesis by showing that firms with larger initial returns received more press coverage and, in the case of internet firms attracted more traffic at their web sites. Stoughton, Wong and Zechner (2001) model the idea that companies with high quality products distinguish themselves and their product by going public. One of the implications of their model is that high quality firms, especially in industries subject to high network externalities, are more prepared to pay higher costs for the success of the IPO. In addition, the insiders of these companies are expected to retain a high portion of their shares.

2.2.1.5. Behavioural finance: sentiment and bounded rationality

The adverse selection and agency theoretic models of IPO underpricing assume that investors and issuers are rational but have incomplete information. While these models provide adequate explanations for average underpricing they can hardly explain all of the dramatic changes in underpricing levels as well as the persistent long-term underperformance of IPOs documented in the literature (see Ritter, 1991). Recently, the behavioural theories examined in psychology have been introduced to financial economics, which has spawned a research are called behavioural finance. Arguably, this is not least due to the spectacular rise and fall of internet stocks. This thesis reviews the explanations for underpricing that are based on cognitive and emotional biases by two approaches. Firstly, the investors may behave irrationally by bidding the stock to extreme heights and secondly, it may be that bounded rationality of the issuer results in underpricing. The latter of the two is also linked to contract and agency theories as it views IPO pricing as a negotiation process between the issuer and the underwriter.

Figure 2.3. Behavioural model of risky decisions

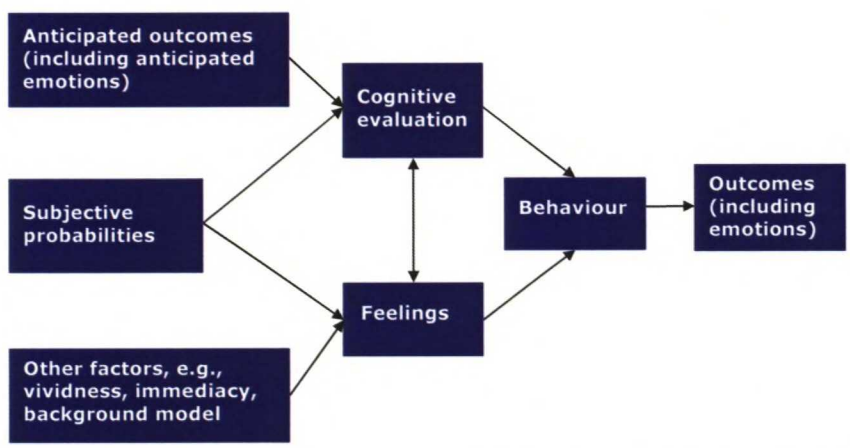


Figure 2.3 provides a model for examining human decision under uncertainty. It illustrates how emotions as well as their mere anticipation can affect decision making. Moreover, bounded rationality arising from the ability to assess probabilities as well as cognitive evaluation capability does have an impact on behaviour.

Source: Loewenstein et al. (2001)

Investor sentiment and irrationality

Ljungqvist, Nanda and Singh (2006) build a model of IPO pricing in hot markets based on the assumption that certain investors may occasionally be irrationally optimistic about IPO stocks. Under the assumption of short sale constraints the modelled results are consistent with long-run underperformance. More importantly, the model implies connections between IPO underperformance and initial price run-up. Their model suggests that the value to the issuer is maximised if underwriters allocate the shares to their regular institutional investors for gradual sale to sentiment investors who arrive to the market over time. The regular investors control supply of the stocks by limiting their sales. Underpricing serves as a compensation for the expected inventory losses arising from the possibility that investor sentiment fades. However, the offering price is set to reflect the demand from sentiment investors to some extent thus, benefiting the issuer. The model also proposes that the greater the bargaining power of the issuer relative to the underwriter, the higher the offer price and the lower the first-day return. Thus, their investor sentiment model is closely linked to explanations of IPO pricing as a negotiation process between the issuer and underwriter.

Cornelli, Goldreich and Ljungqvist (2006) provide empirical evidence of the effect of investor sentiment among retail investors by examining whether their irrational behaviour drives post-IPO prices. They use grey market[32] prices before the IPO as a proxy of retail investor sentiment; high grey market prices indicate overoptimism whereas low gray market valuations are a sign of pessimism. They find high grey market prices as a very good predictor of aftermarket prices, whereas retail investor pessimism does not explain first day aftermarket price. Moreover, they find evidence of long-term underperformance only following high gray market prices. They argue that this asymmetry occurs because institutional investors can choose between keeping the shares they are allocated in the IPO, and reselling them when retail investor optimism is high. Regarding first day run-up in share price, they argue, that as long as the underwriter has some influence to bargain the issue price downwards, over optimism of sentiment investors can explain underpricing.

When it comes to explaining why investors may, at times, be overoptimistic regarding IPO stocks, many speculations can be provided. One reason could be that due to oversubscription in the bookbuilding, many retail investors are allotted only a fraction of the shares they subscribed. Thus, they might get upset and rush to buy the shares that they wanted in the first place. Furthermore,

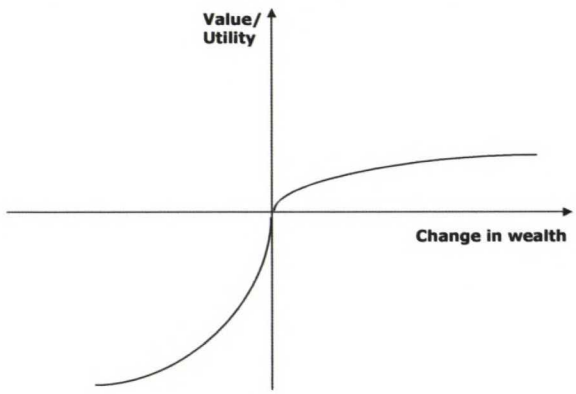
[32] Market for shares before the IPO, during bookbuilding, where investors can trade the shares on a forward basis (i.e. when-issued). These markets are dominated by retail investors. The data consists of 486 companies that went public in 12 European countries between November 1995 and December 2002.

markets tend fall in self-fulfilling prophecies, as mere belief drives action, which results in the fulfilment of the belief itself. Thus, as the statistics of historical average underpricing are known by everyone in the market, the investors may take initial returns of future IPOs as given and act accordingly. Thus, investors are bound to place buy orders to gain from the price run-up, which itself causes the share price to surge.

Bounded rationality of the issuer

The following explanations are based on the assumption that, for whatever reason[33], the underwriter is aiming to bargain the issue price lower, whereas the issuer is negotiating for a higher offer price. Thus, the pricing decision can be examined as a negotiation process between the issuer and underwriter. Underpricing occurs as a result of the bargaining power of the underwriter relative to the issuer. Thus, cognitive and emotional biases together with the structure of the negotiation process may result in an agreement on a lower offer price.

Figure 2.4. Prospect theory and utility function



Prospect theory proposes that the most individuals lose more value for small losses that he or she adds for small gain of the same magnitude (loss aversion) and is risk averse for gains and risk seeking in losses. Applied to the internet IPO context, the theory suggests that decision makers, who made tens of millions in a very short time, would get relatively little added value from bargaining some more millions for themselves.

Loughran and Ritter (2002) present a prospect theory model explaining why issuers allow for considerable underpricing, especially when the equity market has risen during the IPO process. Prospect theory is based on the argument that people are more influenced by the change rather than level of their wealth. Prospect theory predicts that, in most IPOs, issuers will sum the wealth loss from leaving money on the table with the larger wealth gain on the retained shares from a price jump, producing a net increase in wealth for pre-issue shareholders. Moreover, many IT entrepreneurs became multimillionaires in just few years during the late 90s. Loughran and Ritter give an illustrative example of James Clark, cofounder of Netscape, who held 9.34 million shares. Approximately one month before going public Netscape filed a preliminary prospectus with an anticipated price range of $12-$14. Based on the midpoint of the range, the expected value of Clark's shares equalled $121 million. At the closing of first trading day, his

[33] The reason could be conflict of interest or better assessment of the optimal pricing policy and full compliance with the client's best interest

shares were worth $544 million, a 350% increase in his pre-tax wealth in just a few weeks. Now, how could he have been upset about the unnecessary dilution resulting from underpricing? Ljungqvist and Wilhelm (2005), derive a behavioural measure of IPO decision maker's satisfaction with the underwriters' performance based on the prospect theory model of Loughran and Ritter. Ljungqvist and Wilhelm test this measure to explain the decision maker's choice among underwriters in subsequent securities offerings. They find that their behavioural measure reflects in the choice of underwriter in subsequent offerings, as expected. Moreover, underwriters extract higher fees from subsequent transactions when the decision makers are satisfied with the IPO. However, they admit that despite the explanatory power of the model, it does not give direct evidence of whether deviations from expected utility maximisation determine patterns in IPO initial returns.

Furthermore, several academics have paid attention to potential cognitive biases arising from the negotiation process. These issues have received attention as the research has discovered that underwriters do not adjust the issue price fully to reflect the information gained during the registration period. This phenomenon is referred in the literature as partial adjustment. The Benveniste and Spindt (1989) model discussed earlier, suggests that only some private information is left unpriced. However, Loughran and Ritter (2002) argue that strong equity market performance during the registration process can predict underpricing, an argument supported by Lowry and Schwert (2002). Thus, even public market information is only partially adjusted into the issue price. This gives room for the prospect theory explaining why the issue price is only partially adjusted for information that becomes known during the registration process. Moreover, Lowry and Schwert find that although investment bankers do not fully incorporate information learned during the registration period in the offer price, they do seem to fully incorporate the market's valuation of recent IPOs into their pricing of new offerings. This result suggests that the valuation discussions between the issuer and underwriter at the beginning of the IPO process are based on full information, but as time passes the issuer fails to bargain upward revisions into the valuation, even when there would be positive news to support a higher valuation. Thus, it can be argued that issuers might be subject to a cognitive bias referred as "anchoring", as they seem to focus on the initial valuation estimates.

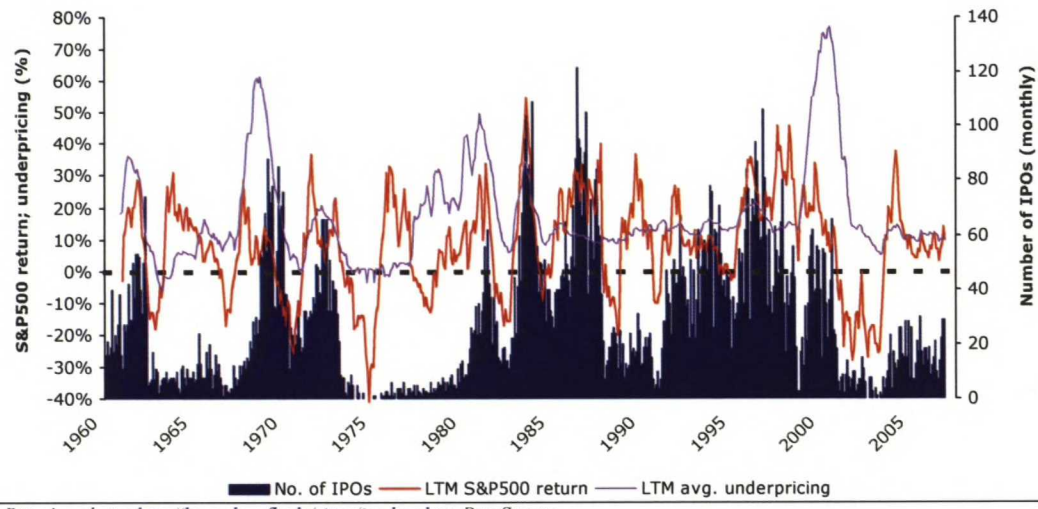
Interestingly, analysis of IPO pricing as a negotiation process could also provide other explanations based on the balance of bargaining power between the issuer and the investment bank. An alternative hypothesis can be developed based on the supply and demand for corporate finance

services. In a hot IPO market there are plenty of deals for the investment banks to do, which could affect the negotiation power of the issuer client. In a cold market the investment banks are fiercely competing for the few IPO mandates. Thus, the client presumably has a stronger position in the pricing talks.

2.2.2. IPO cycles

IPOs have a strong tendency to occur in waves as illustrated in figure 2.5. Based on historical data the IPO volumes tend to peak after a strong rise in the equity market and quickly dry out as the equity market softens. Hot markets have been described as having unusually high volumes of IPOs, severe underpricing, frequent oversubscription of offerings and from time to time concentrations in particular industries (Helwege and Liang, 2004)[34].

Figure 2.5. IPO market cycles in the Unites States



Source: Ritter's website: http://bear.cba.ufl.edu/ritter/ipodata.htm, DataStream

Figure 2.5. Illustrates the strong cyclicality of the IPO market and the relationship between equity market performance, IPO volume and underpricing. Number of IPOs per month is represented by the blue columns and scaled on the right hand side axis. The red line shows the last twelve month S&P500 index return (excluding dividends) scaled on the left axis. The lavender line stands for average (equally weighted) underpricing of IPOs during last twelve months (scaled on the left). The data shows a pattern of strong equity market performance leading to a growth in the IPO volume and contemporaneous increase in underpricing. The astronomical underpricing levels in 1999 and 2000 stand out in the chart, but the corresponding S&P500 return and IPO volume across all sectors are not as distinctive.

The causes of the high fluctuations in IPO volumes are a matter of debate in the research community. Lowry (2001) identifies three factors that prior research has suggested as causes of the

[34] For more information on IPO market cycles see Ritter and Welch (2002) as well as Ibbotson and Jaffe (1975); Ritter, (1984) and; Ibbotson, Sindelar and Ritter, 1994

changes in the number of companies going public. First, the most obvious reason is that due to macroeconomic fluctuations the need for investment and thus, demand for capital oscillates. Thus, there is natural cyclicality in the number of companies seeking external financing. Hence, the first factor is the aggregate capital demand of private firms, i.e. the *capital demand hypothesis*. Second, as discussed informational costs can affect the required return by investors and hence, the cost of capital for a company tapping the equity market. Moreover, companies have alternative sources of external financing that are less exposed to information asymmetry problems, such as debt finance and private equity investors. Information asymmetry could vary over time for many reasons, for instance, changes in the institutional environment. More importantly, precedent IPOs in the near past could serve as reference points for the valuation of new IPOs, especially within the same industry sector, and hence, ameliorate uncertainty over their fair value. This positive feedback effect could explain why IPO volume overshoots. Hence, the *information asymmetry hypothesis* suggests that chances in information related risks over time can explain fluctuation in IPO volume. Finally, as discussed previously, excessive optimism of certain investors could have a positive influence on equity valuations, which would in turn, improve the relative attractiveness of IPO financing. Correspondingly, general pessimism in the investor community could affect the valuation of risky assets. Particularly the appetite for IPOs, equities with distinguishing informational risks, could languish. Thus, the *investor sentiment hypothesis* explains changes in the IPO market by changes in the general level of optimism and pessimism.

In order to test these hypotheses, Lowry selects proxies of the three factors and uses them to explain IPO volume. Proxies for capital demand are based on economic activity as measured by GDP, sales growth, number of new companies and non residential investment. Information asymmetry is represented by dispersion of abnormal returns around earnings forecasts and dispersion of analysts' earnings estimates. As a proxy for investor sentiment Lowry uses the discount on closed-end funds. The results provide strong support for the capital demand hypothesis and investor sentiment hypothesis, whereas informational costs are statistically significant, but economically of secondary importance as a driver of IPO volume changes. Moreover, she tests the relationship of post-IPO returns and IPO volumes and finds that IPO volume is negatively associated with the IPO returns and the equity market return after the issue. This supports the investor sentiment hypothesis implying that issuers are able to successfully go public when a broad class of firms, often the entire market, is exceptionally highly valued. The consistent pattern of poor post IPO performance can persist if rational investors are dissuaded by the cost of implementing arbitrage strategies (Shleifer and Vishny, 1997; Lamont and Thaler 2003). Moreover, this assumption allows for the entire equity

market to be overvalued in relation to rational assumptions on fundamentals at times of excessive optimism as suggested by behavioural finance research. Pagano et al. (1998) study IPOs on the Milan Stock Exchange over a period of 11 years. They find evidence of companies going public when the market-to-book ratio in their industry is higher. A higher ratio does not seem to reflect investment opportunities and companies tend to go public following, not preceding, periods of high capital investment. They argue that the results are evidence of overvaluation rather than growth financing being the primary motive for an IPO. Despite the evidence of the role of investor sentiment, Lowry (2001) highlights her result that changes in capital demand strongly contribute to the IPO cycle phenomenon.

Ibbotson and Jaffe (1975) first noticed a pattern where high initial returns are followed by an increase in IPO volume, which has been confirmed by Lowry and Schwert (2002). Particularly high underpricing persisted during the hot market in 1999. This relationship can seem counterintuitive from the perspective of the issuers; why to go public when the underpricing is the highest? Lowry and Schwert note that the underwriters do not adjust the issue price fully to reflect the valuation information gained from the market during the registration period. According to Lowry and Schwert, the partial adjustment phenomena together with changes in the type of firms that go public explain fully the autocorrelation of initial returns. Thus, as the managers cannot quickly change the basic characteristics of the firm, such as size and industry, nor are they able to forecast the information that will become public during the registration process at the time of the filing, they have very limited opportunities to control underpricing by timing the filing of the issue. Partial adjustment provides a logical explanation for the pattern of underpricing as a leading indicator of IPO volume. Strong appreciation in equity valuations leads to underpricing of IPOs that are in the registration process but also to a higher number of companies seeking to enter the IPO process. Because of this effect the tests for underpricing should include a control variable representing the equity market return over the registration period.

2.3. *Prior research on IPO disclosure*

The IPO prospectus should serve as the primary source of information for investors and information intermediaries. In principle, the document should include all information that is disclosed to investors at the time of the IPO. However, it should be noted that institutional investors participate the road show presentations where they can ask the management clarifying questions. Moreover, the road shows include several one-on-one meetings, where selected institutional investors have an exclusive chance to interview the management. The prospectus is available to the public from EDGAR (Electronic Data Gathering, Analysis, and Retrieval system) managed by the Securities and Exchange Commission. Therefore, it can be assumed that disclosure of value relevant information in the prospectus is an effective means to diminishing information asymmetry. Furthermore, the disclosure decisions made in the prospectus establish the base for continuous reporting. For instance, the segment reporting system used in the prospectus is expected to remain the same in the forthcoming annual and quarterly reports. Thus, there are several good arguments for focusing on the prospectus, when examining disclosure in the IPO context. Despite the importance of disclosure in an IPO and the substantial economic relevance of these transactions there is fairly little academic research on IPO prospectus disclosure. However, during the past five years, a few research papers on the topic have been published. This thesis builds particularly on the work of Leone, Rock and Willenborg (2007).

Leone, Rock and Willenborg (2007) study the IPO prospectus to find more empirical evidence of capital market consequences of disclosure. More specifically, they examine the "use of proceeds" section of the prospectus to determine whether the extent of details given is associated with underpricing. The sample consists of 787 companies from a broad range of industries going public in the U.S. during a two-year-period from January 1993 to December 1994. The results show substantial variation in the specificity of the disclosure and provide evidence of an association between higher disclosure and lower IPO underpricing. They interpret the results as evidence of higher use-of-proceeds specificity as a remedy for ex ante uncertainty, in the sense that the specificity helps investors to estimate the dispersion of secondary market values. In a broader perspective, the results show an association between voluntary disclosure and the foremost cost of capital, IPO underpricing. As the paper correctly notes, the companies may choose to give low level of detail in their discussion of the use of proceeds for many reasons. One reason could be that the strategic flexibility wanted by the management does not allow for any commitment in the use of proceeds. Therefore, specificity could be interpreted as an indicator of strategic clarity of the

company and/or predictability of the industry. However, the paper also constructs a model that takes into account the possibility that their disclosure measure is endogenous with underpricing. Throughout the analysis the researchers endeavour to consider "first order" real effects versus "second order" disclosure effects that underlie their measure's relation with underpricing.

Bukh, Nielsen, Gormsen and Mouritsen (2004) examine the disclosure of intellectual capital in IPO prospectuses of 68 Danish companies going public 1990-2001. They analyse the prospectuses based on an index of 78 items covering information on employees, customers, IT, processes, research and development and strategic statements. They find that the extent of managerial ownership prior to the IPO and industry type affects the amount of voluntary intellectual capital disclosure, while company age and size show no significant association. Furthermore, they report that disclosure on intellectual capital has increased during the observation period, which suggests that the issuers and underwriters regard intellectual capital as value-relevant information. Consistent with their hypothesis, high tech companies choose higher level of intellectual capital disclosure than low tech companies.

Guo, Lev and Zhou (2004) focus on the proprietary cost hypothesis of disclosure by examining disclosure of product related information in the IPO prospectuses of biotech companies. Biotech sector is selected based on the small number and high intellectual content of products as well as fierce competitive environment. These factors emphasise the relevance of competitive costs. They find three factors that are positively associated with disclosure: the stage of development of the product, patent protection and venture capital backing. Moreover, ownership retained by the pre-IPO owners is negatively associated with disclosure. The results are highly consistent with the competitive cost theory. In addition, they find evidence of a negative association between disclosure and information asymmetry by testing the bid-ask spread, liquidity (quoted depth) and stock return volatility as proxies. Similarly to Bukh, Nielsen, Gormsen and Mouritsen, the paper recognises the need for accounting standards that better incorporate intellectual capital. A commentary article by Hribar (2004) gives recognition for the research design focusing on product specific information. However, he also points out several weaknesses of the choice to focus on the IPO prospectus. Firstly, he notes that the prospectus is not written by the management but by the underwriter and lawyers, who take care that the litigation risk is minimised. Therefore, much of the content is determined by the SEC requirement of *full, true and plain disclosure of all material facts.* Hribar also points out that litigation risk in U.S. has likely increased during the 21st century. Thus, the management has limited discretion over the content. Hribar goes on to argue that the remarkable

firm level influence on disclosure could be due to the choice of investment banking, accounting and legal advisors. This argument questions the validity of the proprietary cost measures tested. Second concern is that firms have legitimate reasons to time their IPO to a period when management believes that proprietary costs are the lowest. Moreover, Hribar argues that the capital injection from the IPO itself could reduce proprietary costs. He also recognises the common problem of measures for discretionary disclosure: the fact that disclosure might be stipulated by the information available to the management. Hribar also criticises the use of bid-ask spread as proxy of information asymmetry as it reflects the short term order imbalance risk, not the risk over long term performance. He concludes that the results provide spurious evidence of the relationship between disclosure and cost of capital and suggests use of direct measures of cost of capital.

Schrand and Verrecchia (2005) examine disclosure frequency before the IPO and find that higher disclosure is associated with less underpricing. The negative relation is only significant for relevant releases, not disclosures such as public relations announcements. However, the results for internet firms are opposite, as their disclosure frequency is positively related with underpricing. The researches interpret this as supporting evidence for the claim that internet firms use underpricing to generate attention and market their products. The results hold after controlling for the partial adjustment phenomenon but are weaker. In addition, Schrand and Verrecchia find that greater disclosure is associated with greater market liquidity measured by the bid-ask spread and market depth.

Finally, Jog and McConomy (2003) examine voluntary disclosure of management earnings forecasts in the IPO prospectus. They study a sample of Canadian firms that are allowed to disclose earnings forecasts in the prospectus and report a favourable and noticeable impact on the underpricing and post issue share performance. Small companies and firms that make conservative estimates are shown to benefit the most. Their evidence suggests that if the legal system would allow for management estimates, they would provide an incremental method for reducing the uncertainty in an IPO.

2.4. Literature Summary and Conclusions

Based on current theoretical understanding in the literature on information asymmetry and capital markets it can be argued that information asymmetry is linked to investors' assessment of risk and hence, required rate of return. However, the literature has not reached an unambiguous conclusion on whether the relationship is positive or negative (Botosan, 2006). Thus, the issue is fundamentally an empirical question. However, due to problems in measuring "information asymmetry", "disclosure" and "cost of capital" as well as other methodological complexities, the empirical evidence cannot provide definite answer to the case either. Despite this, thorough review of prior empirical evidence gives support to the assumption that disclosure of specified, value relevant information is an efficient tool in ameliorating information costs in public equity markets. Moreover, disclosure appears to have indirect consequences to capital markets as it arguably attracts sell-side analysts and institutional investors. These intermediaries serve an important function in the information and capital flows of modern capital markets. Furthermore, from the perspective of a large publicly listed corporation they are a necessity for obtaining external equity financing as long as the company remains public. Thus, there is a clear rationale for informative disclosure policies by publicly listed corporations. Moreover, the literature provides several other management motives that may influence disclosure decisions. Despite incentives to exaggerate the value of the firm there are legal controls as well as evidence of market penalisation for dishonest hype. Thus, in general, management voluntary disclosures can be presumed credible. This assumption is supported by empirical evidence.

In the IPO literature, there is extensive statistical evidence of first trading day share price appreciation averaging a puzzling 10-20%. As with disclosure and its capital market consequences, a cohesive theory to explain this phenomenon is yet in the process of formulation. What we do know is that the extent of "underpricing", as the phenomenon is called, varies remarkably as a function of time. Moreover, country-specific differences appear strong and seem to be related to differences in legal and institutional structure as well as macroeconomic development. This thesis summarises the explanations for underpricing in five categories; capital market motives, principal-agent models, marketing externalities, behavioural finance and practical reasons. Prior literature tends to emphasise differing explanations. More specifically, research prior to the hot IPO market of the late nineties holds capital market motives and adverse selection the prime reason for underpricing, whereas 21st century literature has focused on principal-agent models, behavioural finance and externalities. Prior literature also gives a vast body of evidence on the differences in

IPO market characteristics under "hot" and "cold" markets. Theory to explain market fluctuations is based on capital demand, but also on information asymmetry and investor sentiment.

Research on the role of disclosure in IPOs has also gained ground after the internet boom of 1999 and 2000. Leone, Rock and Willenborg (2007) examine the "use of proceeds" disclosure of a broad sample of companies going public in 1993 and 1994. They find evidence of a link between more specific use of proceeds disclosure and lower underpricing. They argue that companies that provide more specific information on the use of IPO proceeds have less ex ante uncertainty in the sense that the information helps investors estimate the dispersion of secondary market values. Thus, disclosure to ameliorate adverse selection and estimation risk can reduce the cost of capital in IPOs. Schrand and Verrecchia (2005) provide further evidence of disclosure having an impact on IPO underpricing. Their sample includes 2,520 IPOs occurring during the years 1990 through 1999. By examining a disclosure measure based on the frequency of announcements before the IPO, they find that higher disclosure is associated with less underpricing. Interestingly however, the results for internet firms are the opposite; disclosure frequency is positively related with underpricing. The researches interpret the result as evidence of marketing externalities as a motive for internet firms to under price. The aforementioned results from IPOs in the 90s raise an interest to examine how disclosure and underpricing patterns have developed from the internet boom in 1999-2000 to the cold market for IT stocks experienced in the years following the bubble burst.

3. HYPOTHESES

This thesis tests the determinants and consequences of use of proceeds disclosure in the IPO prospectus. Hypotheses I-V examine the determinants of disclosure and hypothesis VI tests whether more specific disclosure has an impact on underpricing.

As discussed in the literature review, companies may obtain benefits from disclosure of investment plans. The benefits of disclosure are particularly high for larger companies, which are raising more money from public sources. Thus, larger companies should be willing to disclose more specific information. Moreover, prior research of Raffournier (1995) finds that larger and more international companies tend to disclose more. Hypothesis I follows accordingly:

Hypothesis I: larger companies disclose more of their use of proceeds

The success of an IPO is dependent on investors' demand for the stocks. Based on theory it can be argued that the riskier the IPO candidate the more investors put pressure on the investment case. When the investors are expected to ask more specific questions about the use of proceeds, the issuer should naturally produce and disclose more information. Therefore, it can be hypothesised that riskier companies disclose more of their investment plans.

Hypothesis II: riskier companies disclose more of their use of proceeds

Managers of profitable companies might be more willing to disclose their strategy and investment plans than managers of loss making companies. This is because loss making companies might have to reserve part of the proceeds for covering future losses, which sounds like a bad investment case. Also Raffournier argues that managers of profitable companies are eager to disclose how they make the profits, whereas loss making managers are trying to hide their failures. Moreover, profitable companies may be less vulnerable to competition and thus, in better position to disclose more of their strategy.

Hypothesis III: Profitable companies are more specific in their use of proceeds section.

Based on prior research companies that are more dependent on external financing can be assumed to be willing to disclose more specific information to the market. This is because they need to

secure investor demand by giving the best available information to the investors. Companies that are most dependent on external financing are those with large deal value compared to revenues. On the other hand more leveraged companies are more in need of equity financing as their access to debt market can be limited.

Hypothesis IV: companies with higher need for financing tend to disclose more

One of the fundamental motives for corporate disclosure is to ameliorate agency concerns. Thus, according to agency theory, the better the incentives of the insiders and new investors are aligned the less there is need for monitoring. And the other way around, the more there are concerns of moral hazard, the closer the monitoring should be. Thus, when the insiders retain a higher post-IPO stake the issuer is under less pressure to disclose the plans for use of proceeds. Hypothesis V follows.

Hypothesis V: when the insiders retain a higher post-IPO stake the issuer is less specific in disclosure of use of proceeds.

After examining firm and transaction specific characteristics that could affect disclosure decisions, the thesis turns to examine the potential benefits that could arise from more specific disclosure. In theory, companies that disclose more specific information would be less exposed to information asymmetry and adverse selection costs. Adverse selection costs could be reflected in the extent of underpricing. The higher risk of adverse selection the higher the discount should be to induce uninformed investors. Prior empirical evidence from a broad sample of industries by LRW suggests that disclosure of use of proceeds can ameliorate underpricing. This thesis tests whether this holds for high tech companies.

Hypothesis VI: more specific use of proceeds disclosure is associated with lower underpricing.

4. EMPIRICAL ANALYSIS

The following section of this thesis provides the empirical analysis of 316 IPOs of high tech companies listing on NASDAQ in 1999-2006. The section begins by introduction to the sample and variables used. Thereafter the descriptive statistics are presented. Finally statistical tests are presented under heading 4.3 "Regression analysis".

4.1. Description of sample selection

The sample is based on high tech companies going public on NASDAQ during the years 1999-2006. The IPO observations are obtained from Dealogic database. High tech companies are chosen based on specific industry (SIC) codes, which can be found in Appendix 1. The sample is split into two sub samples in order to examine the differences between hot and cold markets. The "hot market" sample includes IPOs from January 1999 to March 2000. The period is chosen based on the extremely strong equity market performance particularly on the NASDAQ (see figure 4.2.). The cold period encompasses IPOs with pricing dates in months starting from October 2000, six months from the hot period, and ends in December 2006. From the initial database the number of observations for the hot period is 390 and for the cold period 269. In order to improve homogeneity the sample is limited medium sized IPOs with deal size USD 75-200 million. This reduces the hot period sample to 161 and the cold period sample to 116 observations. Finally after excluding offerings other than common or ordinary shares, such as American Depository Shares (ADS), the final sample consists of 150 observations from the hot period 99-00 and 103 from the cold period. Moreover, a sample that includes all corresponding IPOs from January 1999 to December 2006, including the 6 months between the cold and hot period, encompasses a total of 316 observations. Table 4.1 summarises the sample selection process.

Table 4.1. Sample selection process

	Hot period	Cold period	Total sample[1]
Initial sample from Dealogic	390	269	836
- Deal size USD 75-200 million	-229	-153	-489
Observations after deal size constraint	161	116	347
- Exclude all ADS offerings	-11	-13	-31
Final sample	**150**	**103**	**316**

1) Total sample includes all corresponding IPOs during 1999-2006 including the 6 month period between hot and cold period.

Figure 4.2. Distinction between hot and cold IPO market

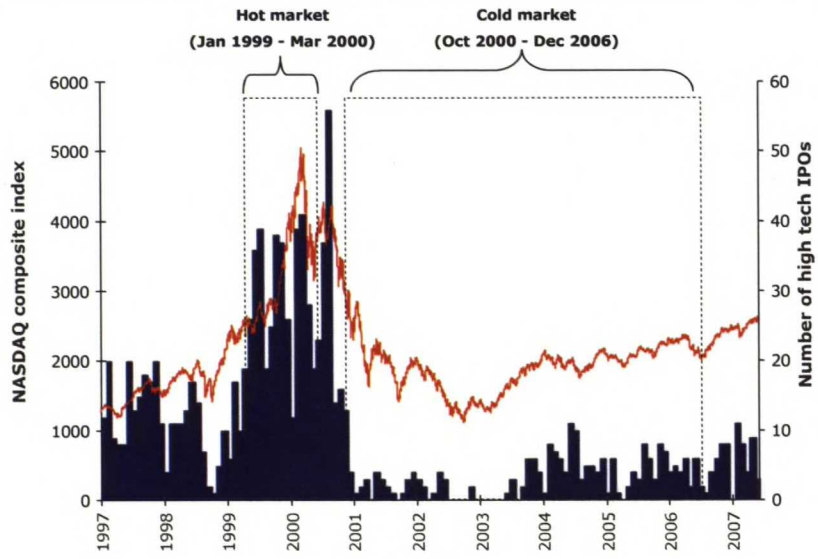


Figure 4.1. shows data on NASDAQ index performance and total number[1] of high tech IPOs on NASDAQ from Dealogic. Chart demonstrates the sample split into hot and cold period. The hot period is chosen based on strong equity market performance as reflected in the NASDAQ index. The cold period is separated based on NASDAQ stabilising below 2500 points. As shown in the chart IPO volume picks up during the hot period, but continues high for approximately 6 months before collapsing right before the beginning of the cold period.

Source: Dealogic, DataStream

1) Number of high tech IPOs corresponds to the "initial sample from Dealogic" in the sample selection process

4.2. Variables

In the following the measure for disclosure is presented followed by introduction to other variables used in the statistical tests.

4.2.1. Measuring voluntary disclosure

Tests of disclosure have to cope with the problem that the chosen measure is never a perfect estimate of total disclosure. Prior research provides three different groups for disclosure measures. The first approach is to use disclosure index, which is constructed based on certain check list items. In the past a popular disclosure index has been AIMR (Association for Investment Management and Research[35]) disclosure ranking, which has been discontinued. An alternative for the researcher is to construct own checklist based index score and collect the data. The second group of disclosure measures is based on a selected disclosure channel, such as conference calls or investor relations material. The third group of measures focuses on a narrow piece of information such as management forecasts. This thesis focuses on use of proceeds disclosure measured with *Specificity,* the percentage amount of proceeds earmarked for a specific purpose. The advantage of specificity as a disclosure measure is that it is measurable and can be assumed to provide value relevant and

[35] Name changed to CFA Institute

credible[36] information to investors before the IPO. As discussed the prospectus should be an effective channel for disclosure to the general public as it is available to everyone from EDGAR. Moreover, it can be that in the absence of use of proceeds disclosure in the prospectus, certain institutional investors could still get some management estimates of the planned use of the proceeds in private discussions. Thus, the measure has potential to ameliorate information asymmetry. However, a drawback of the measure is that it is context specific and does not readily generalise. In addition, as Leone, Rock and Willenborg (2007) (hereafter referred as LRW) correctly emphasise, it is very difficult to analyse the effect of disclosure decision separately from the endogenous relationships that explain the specificity in prospectus[37]. Particularly the fact that the management can only disclose what they know themselves poses an issue on the interpretation of specificity variable. Following their example, specificity is further decomposed into specific uses of proceeds by introducing own specificity variables for each identified subgroup of funds use.

4.2.2. Definitions and introduction of variables

Table 4.3 introduces the variables used in the empirical analysis. More specific information on the calculation of the test variables can be found in Appendix 2. The main variable is Specificity, which is the dollar amount of specified uses of proceeds as percentage of total net proceeds to the issuer. Specificity is further divided into sub categories *Specificity-Debt* and *Specificity-NonDebt.* Specificity-Debt is the percentage amount dedicated for debt repayments and Specificity-NonDebt represents all other uses of proceeds. Other specificity subcategories, that are not used in statistical tests, are Specificity-R&D, Specificity-Shrhlds, Specificity-AMPS, Specificity-WC and Specificity-Other. The first denotes proceeds to be used for research and development, the second measures payments to pre-IPO shareholders. Specificity-AMPS measures proceeds used for marketing and sales. Specificity-WC is proceeds used for specific working capital purposes. Specificity-Other marks other specified purposes. Finally, Specificity-ExpAcq includes all other subcategories except debt and payments to pre-IPO shareholders.

The models employ several variables that represent firm qualities. These variables are *Sales, Assets, Employees, Age, B/M, Debt/TA and DV/Sales.* Moreover, dummy variables *Profit*, *Bio* and *StartUp* represent firm qualities. Sales is the annual revenue of the company from the most recent financial

[36] Credibility follows from legal liability as the U.S. securities law does not provide any safe harbor for forward looking statements in IPO prospectuses. Moreover, the companies must report the actual use of proceeds once the funds are used. For a more specific discussion on the credibility of use of proceeds disclosure see Leone, Rock and Willenborg (2007), page 120, footnote 7.

[37] A two step regression method is used to control for the endogenous relationships between disclosure and the firm characteristics. LRW also use the same two step method.

year. Assets is the total assets of the company before the IPO. Employees stands for the number of employees of the company. Sales and Employees are prime measures of firm size. Age is the time, in years, from incorporation of the company. It is used to control for the maturity and investor awareness of the company. Management teams of more mature companies should have better strategic clarity on the use of proceeds. More mature companies could also be perceived as less risky. B/M is the book-to-market multiple of the company. Book-to-market variable aims to capture investors' valuation expectations as well as the value of intangible assets. High book-to-market can be interpreted as a proxy for conservative valuation. Debt/TA is debt scaled by total assets and represents a measure for leverage. DV/Sales is deal value scaled by sales. DV/Sales is a measure for the need for external financing. The larger the deal is compared to revenues, the more the company is dependent on external financing. Dummy-Profit equals 1 if the company is profitable, loss-making companies have the value of 0. Many of the sample companies are loss-making or have minimal sales, which restricts use of margins as measure of profitability. Start-up companies are identified by a dummy variable that marks the companies with less than USD 10 million in annual sales before the IPO. Offerings of these companies are the ultimate tests of investor confidence as historical financials cannot be used to valuate them. Similarly to start-ups the biotechnology and small pharmaceutical companies have a very distinct risk profile. Developing biotechnology and pharmaceuticals is a long process as it may take up to twenty years before the products can be introduced to the market, if ever. Before market launch the projects require heavy R&D and marketing expenditure. As these companies are riskier, the investors might ask more questions about the use of proceeds.

Retained, TRNScost and TopIB form a group of variables that describe the IPO transaction characteristics. A high percentage of shares retained can act as a credible signal that the pre-IPO shareholders are confident on the future of the company as they are willing to remain exposed to the company share performance. Thus, it could be that investors trust more IPOs with a high stake retained. If so these companies would face less pressure to disclose their investment plans. Transaction costs could act as a proxy of transaction complexity or marketing expenditures to induce demand for the share. More importantly as fees are paid as compensation from the issuer (principal) to the underwriters and lawyers (agents) they could provide a proxy for agency costs. The underwriter has an important certification role, and thus the more prestigious the investment bank, the less there is need for other assurance such as disclosure. Underwriter prestige is measured

by a dummy variable *TopIB* that distinguishes six most prestigious investment banks according to a ranking by Loughran and Ritter (2004)[38].

RunUp, Bid-Ask, Preperform and *Dummy-Hot* form a group of variables that describe market conditions and trading behaviour. RunUp marks the share price gain during the first day of trading. RunUp can be interpreted as an additional cost to the issuer, assuming that the issue could have been sold with an offer price closer to the first day trading close. Bid-Ask is a market based measure for risk. The higher the bid ask spread the higher market risk should be. Preperform is a measure for equity market performance prior to the issue. Based on literature review it should be highly correlated with RunUp. Dummy-Hot marks the IPOs that took place during the hot market period January 1999 to March 2000. It should be noted that the so called cold period is simultaneous with Sarbanes-Oxley act that has imposed more supervision and rules for publicly traded companies. To my knowledge Sarbanes-Oxley act does not impose direct requirements for prospectus disclosure, but due to overall more stringent legal environment, it could be that cold period issuers tend to disclose more due to Sarbanes-Oxley act.

Table 4.3.

Descriptions of variables

Variable name	Description	Sources
Sales	Total sales in the latest fiscal year before the IPO	Prospectuses
Assets	Total assets in the latest balance sheet of the company before the IPO	Prospectuses
Employees	Number of employees at the time of the IPO	Prospectuses
Age	Company age in years. Calculated as the difference of IPO year and founding year	Ritter's website, company prospectuses
B/M	Book-to-market ratio, equity values calculated before the offering	Prospectuses
Debt/TA	Pre-IPO interest bearing long term and short term debt divided by pre-IPO total assets	Prospectuses
DV/Sales	Transaction gross value in millions of USD including the issue of new shares, secondary sale and greenshoe shares, scaled by total sales	Prospectuses, Dealogic
Retained	Percentage of shares retained by the selling shareholders. Number of shares after the IPO less shares issued and sold in the offering scaled by number of shares	Prospectuses, Dealogic
TRNScost	Underwriting discounts, commissions and other offering expenses. Gross proceeds less net proceeds as percentage of gross proceeds	Prospectuses
RunUp	Underpricing measured by share price appreciation during first day of trading. The difference of first day close and offering price scaled by offering price	Bloomberg, Dealogic
Bid-Ask	Average bid-ask spread scaled by stock price during the first 6 months of trading. Calculated on a daily basis. Starting 5 days after the IPO	Bloomberg
PrePerform	NASDAQ price index change from 120 days (4 months) prior to pricing date	DataStream
Dummy-Profit	Value of 1 if the company had operating profit, 0 if operating loss	Prospectuses

[38] The only six underwriters, found in the sample, that have the maximum score of 9 during the whole period of 1992-2004 are Credit Suisse, Deutsche Bank, Goldman Sachs, JPMorgan, Merill Lynch and Morgan Stanley

Table 4.3. - *Continued*

Variable name	Description	Sources
Dummy-TopIB	Value of 1 if the lead underwriter appearing first in the prospectus is one of six investment banks that have the maximum score of 9 during years 1992-2004 in the investment bank ranking by Loughran and Ritter (2004)	Dealogic, Ritter's website
Dummy-StartUp	Value of 1 if the issuer had annual sales less than USD 10 million in the latest fiscal year before the IPO	Prospectuses
Dummy-Bio	Value of 1 if the issuer is a biotech or pharmaceutical company as determined by the SIG classification	Dealogic
Dummy-Hot	Value of 1 if the pricing date of the IPO is between January 1999 and March 2000 (i.e. "hot market")	Dealogic
Specificity	Dollar amount of specified uses of proceeds as percentage of net proceeds to the issuer	Prospectuses
Specificity-Debt	Amount of proceeds announced to be used for debt payback as percentage of net proceeds	Prospectuses
Specificity-NonDebt	Amount of proceeds to be used in non-debt purposes: Specificity less Specificity-Debt	Prospectuses

Table 4.3 introduces the variables used. More specific information on the variables is reported in the text.

4.2.3. Descriptive statistics and correlations

For the total sample of 316 IPOs Panel A of table 4.4 presents descriptive statistics of the aforementioned variables by quartile of specificity. The table can be analysed in comparison with the corresponding table 1 in the research article of Leone, Rock and Willenborg (LRW) that gives statistics of a broad sector sample. To begin with sample *Specificity* has much lower mean values than reported by LRW. Total sample average is 34.5% and cold sample average 43.4% compared with 67.8% in LRW sample. This reflects the high importance of proprietary costs in the high tech sector as well as the management need for strategic flexibility. Interestingly, Specificity mean is nearly twice higher in the cold sample compared to hot sample implying that proprietary costs and flexibility might not be the only explanations for low disclosure specificity in the hot sample. As discussed previously Sarbanes-Oxley act might play a role in the substantially higher disclosure specificity during the cold period. Next it is appropriate to take a look at the subcategories of specificity presented in Panel B of table 4.4.

Table 4.4.

Descriptive Statistics

Panel A: By hot and cold market samples and quartile of use-of-proceeds disclosure specificity

Variable		Total (N=316)	Hot (N=150)	Cold (N=103)	Most vague 1st Quartile (N= 79)	2nd Quartile (N=79)	3rd Quartile (N=79)	Most Specific 4th Quartile (N=79)
Sales	Mean	65	32	112	37	45	81	92
	Median	21	15	48	19	22	17	32
Assets	Mean	101.0	69.2	152.7	68.1	77.5	104.6	153.8
	Median	50.4	32.3	74.9	36.2	37.0	54.6	89.1
Employees	Mean	399	278	542	221	325	393	656
	Median	192	179	232	179	186	183	274
Age	Mean	9.7	7.4	13.0	8.7	6.3	9.6	14.3
	Median	6.0	4.0	9.0	6.0	4.0	6.0	8.0
B/M	Mean	0.10	0.08	0.14	0.09	0.08	0.09	0.16
	Median	0.07	0.05	0.11	0.06	0.04	0.07	0.11
Debt/TA	Mean	0.22	0.25	0.17	0.11	0.22	0.16	0.37
	Median	0.06	0.07	0.05	0.02	0.08	0.05	0.17
DV/Sales	Mean	62.2	89.0	26.3	24.9	115.9	69.4	36.7
	Median	4.8	6.8	2.0	5.0	4.4	6.1	2.8
Retained	Mean	76.5%	77.1%	74.4%	78.2%	78.3%	77.1%	72.6%
	Median	77.7%	79.4%	74.9%	77.3%	80.6%	78.4%	74.6%
TRNScost	Mean	8.9%	8.5%	9.5%	8.8%	8.7%	8.8%	9.2%
	Median	8.5%	8.3%	9.2%	8.6%	8.4%	8.5%	8.9%
RunUp	Mean	77%	128%	19%	98%	119%	67%	25%
	Median	40%	100%	15%	55%	77%	34%	17%
Bid-Ask	Mean	1.0%	1.0%	0.7%	1.0%	0.9%	1.1%	1.2%
	Median	0.9%	1.0%	0.5%	1.0%	0.8%	0.8%	1.0%
PrePerform	Mean	13.1%	27.8%	2.4%	13.8%	19.4%	12.2%	6.9%
	Median	10.4%	25.2%	3.9%	9.5%	14.2%	11.3%	6.6%
Dummy-Profit	Frequency	86	25	45	16	15	20	35
	% of 1s	27%	17%	44%	20%	19%	25%	44%
Dummy-TopIB	Frequency	197	95	60	56	50	45	46
	% of 1s	62.3%	63.3%	58.3%	70.9%	63.3%	57.0%	58.2%
Dummy-StartUp	Frequency	72	42	11	16	19	18	19
	% of 1s	22.8%	28.0%	10.7%	20.3%	24.1%	22.8%	24.1%
Dummy-Bio	Frequency	52	8	25	14	4	12	22
	% of 1s	16.5%	5.3%	24.3%	17.7%	5.1%	15.2%	27.8%
Dummy-Hot	Frequency	150	150	0	34	63	32	21
	% of 1s	47.5%	100.0%	0.0%	43.0%	79.7%	40.5%	26.6%

(Continued)

Panel A presents total sample averages and medians. From left to right the first column shows total sample (N=316) statistics, followed by the Hot (N=150) and Cold (N=103) sub samples. The last four columns present mean values from the total sample ranked by quartiles of use-of-proceeds specificity. Specificity increases from left (1st quartile) to right (4th quartile).

Table 4.4. - *Continued*

Panel B: Specificity subcategories by hot and cold market samples and quartile of specificity

Variable		Total (N=316)	Hot (N=150)	Cold (N=103)	Most vague → 1st Quartile (N= 79)	2nd Quartile (N=79)	3rd Quartile (N=79)	Most Specific 4th Quartile (N=79)
Specificity	Mean	34.5%	23.3%	43.4%	0.0%	7.4%	45.4%	85.0%
	Median	22.4%	7.6%	42.0%	0.0%	5.8%	48.4%	85.0%
Specificity-Debt	Mean	11.5%	7.1%	16.8%	0.0%	3.7%	11.3%	31.0%
	Median	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.3%
Specificity-NonDebt	Mean	22.9%	16.2%	26.5%	0.0%	3.7%	34.1%	54.0%
	Median	2.5%	0.0%	7.1%	0.0%	0.0%	36.1%	70.6%
Specificity-ExpAcq	Mean	7.4%	6.2%	6.8%	0.0%	1.3%	11.0%	17.3%
	Median	0.0%	0.0%	0.0%	0.0%	0.0%	1.4%	0.0%
Specificity-R&D	Mean	6.7%	2.4%	10.4%	0.0%	0.5%	9.4%	17.0%
	Median	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Specificity-Shrhlds	Mean	2.5%	2.1%	4.0%	0.0%	0.8%	3.0%	6.1%
	Median	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Specificity-AMPS	Mean	4.1%	4.3%	2.7%	0.0%	0.5%	7.6%	8.5%
	Median	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Specificity-WC	Mean	0.3%	0.0%	0.5%	0.0%	0.0%	0.6%	0.5%
	Median	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Specificity-Other	Mean	1.9%	1.2%	2.1%	0.0%	0.6%	2.6%	4.6%
	Median	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Panel B presents mean and average values of Specificity by subcategory. Correspondingly to Panel A data is shown from left to right for the total sample, hot and cold sample followed by quartile out of the total sample.

Panel B shows the mean values of subcategories of specificity across samples. Disclosed debt repayments account on average for 11.5% of the proceeds, a much lower value compared to 38.1% in the LRW sample. Disclosed non-debt uses of proceeds are twice more prominent, representing 22.9% of proceeds. As debt repayments are fairly low cost and convenient to disclose, Specificity-Debt may tell more about the actual plans for deleveraging and capital structure than disclosure decisions. Subcategories of Specificity are highly consistently increasing with aggregate Specificity. This relieves concerns about the actual use of proceeds dominating the disclosure decision of use of proceeds. Differing from the sample of LRW, debt and non-debt uses of proceeds are in harmony across quartiles of specificity, which is largely attributable to sample restriction to one industry sector. Based on descriptive statistics, one could argue that the overall willingness to specify use of proceeds has nearly doubled from the hot sample to the cold sample whereas the effects of firms' real investment decisions are reflected in the shift from marketing expenditures to R&D.

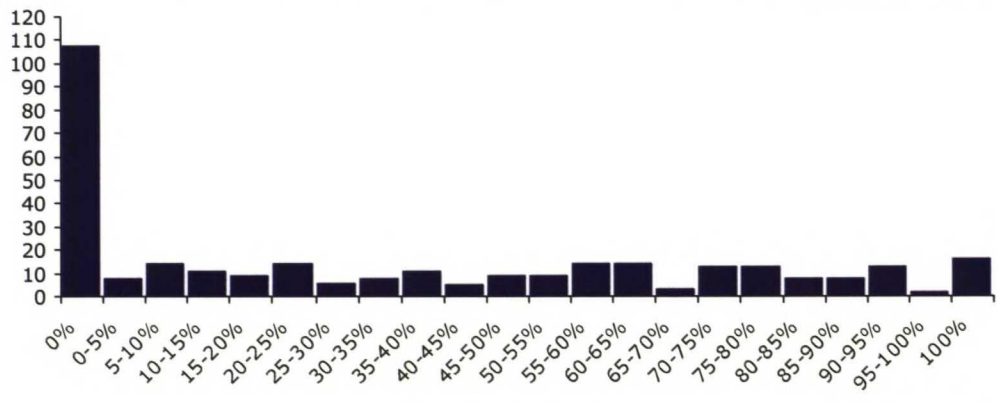
As Specificity is the key test variable and main subject of interest, it is necessary to take a closer look at the distribution of this variable. Naturally disclosure can have values from 0% to 100%. Moreover, as shown by table 4.5., the distributions of specificity are strongly concentrated on the

value of 0%. In fact, approximately one third of the companies in the total sample are totally vague about their uses for the IPO proceeds. The histogram in panel A shows that Specificity seems to follow a uniform distribution outside the dominating value of 0. Panel B shows slight concentration around the low end of the scale for Specificity-Debt, meaning that many companies disclose allocation of a small portion of the proceeds for debt repayment. This is consistent with the assumption that disclosing debt repayments is easy and thus, is generally done when a plan exist. Specificity-NonDebt is highly concentrated on the value of zero. Almost half of the companies disclosed nothing specific about non-debt uses of the proceeds. Outside the value of zero Specificity-NonDebt seems to follow a uniform distribution. If it were so that companies would disclose everything they know about the use of proceeds it would presumably show as higher concentration of observations near the value of zero. However, as the observations are more spread it could well be that the decision to disclose is strongly associated with Specificity-NonDebt.

Table 4.5.

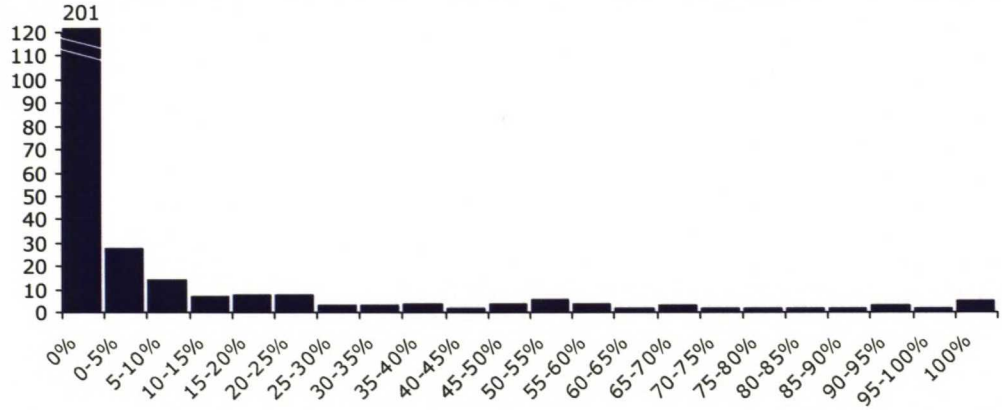
Distributions of specificity variables

Panel A: Histogram of *Specificity* variable (N=316)



Continued

Panel B: Histogram of *Specificity-Debt* variable (N=316)



Panel C: Histogram of *Specificity-NonDebt* variable (N=316)

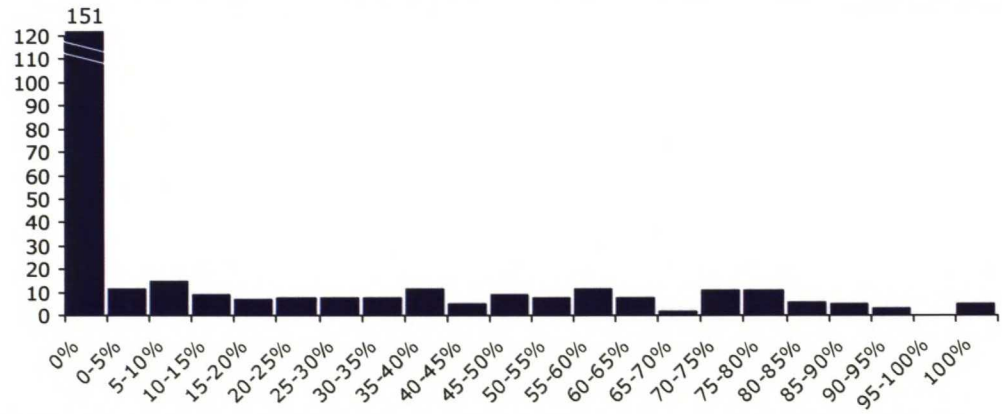


Table 4.5 presents the distributions of *specificity* variables from the total sample of 316 observations

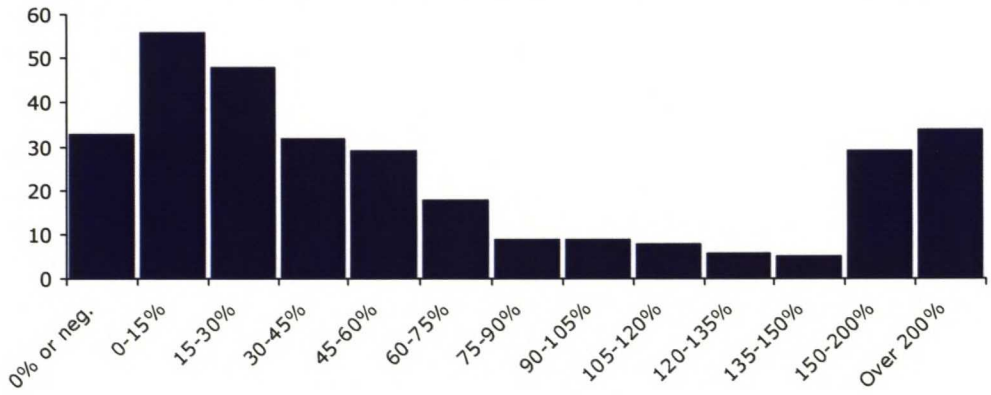
Next the focus turns to RunUp, which is hypothesised to be related to disclosure in the sense that disclosure should ameliorate the need for attractive pricing to the investor public. As naturally expected the mean values from Panel A of table 4.4. are considerably higher in the hot sample. Median RunUp in the cold sample is 15% compared with 100%, a doubling in share price, in the hot period. Due to the long right tail of RunUp distribution, averages are much above medians, particularly in the hot sample. Furthermore, analysis of RunUp across specificity quartiles shows that the most specific quartile clearly stands out from the other quartiles. Underpricing, on average, is much lower among firms with most specific use of proceeds disclosures. 4th quartile IPOs experienced average RunUp of 25% whereas RunUp in quartiles from 3rd to 1st averaged 67%, 119% and 98%, correspondingly. The same pattern emerges when analysing RunUp medians. Clear explanations for highest RunUp in the 2nd quartile are difficult to find, but one reason could be that this quartile is characterised by companies that had to disclose something to defend themselves

against investor pressure, but opted for minimum disclosure. Table 4.6 shows histograms of RunUp in total sample, hot sample and cold sample (see panels A, B and C, correspondingly). There is a very clear cut between hot and cold samples. The distribution of the total sample well describes this divine as the lower end of the distribution characterises the cold market observations and the high end includes only observations from the hot period. The cold market observations are clustered around 15-20%, whereas a large part of the hot market observations are values over 150%. To put it bluntly, the distribution of cold market observations "makes sense", whereas the majority of hot market RunUp's are just obscene.

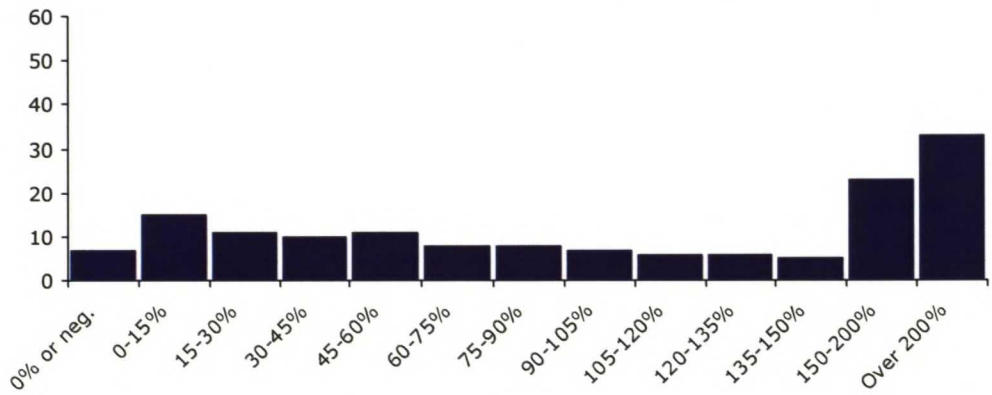
Table 4.6.

Distributions of RunUp by subsample

Panel A: Histogram of *RunUp* in the total sample (N=316)



Panel B: Histogram of *RunUp* in the hot market sample (N=150)



(Continued)

Panel C: Histogram of *RunUp* in the cold market sample (N=103)

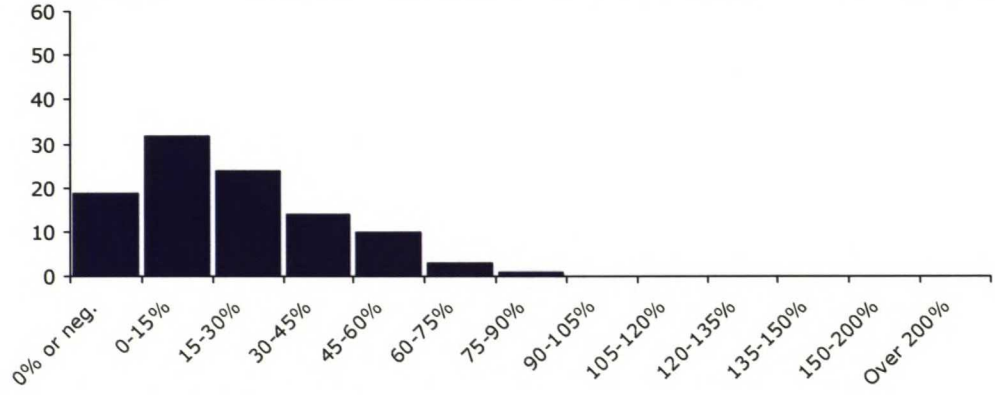


Table 4.6 presents distributions of RunUp in the total sample as well as sub samples for the two distinct market conditions. Data shows how underpricing has changed dramatically from the hot period to cold period.

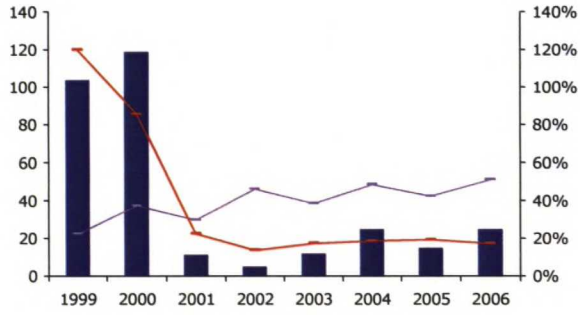
Time series analysis of key variables

Figure 5.1 gives a time series analysis of the key variables Specificity and RunUp. The year by year analysis in panels A and B shows drastic decline in underpricing that marked the end of the hot IPO market. In addition, panel A shows some signs of a steady increase in Specificity over time. However, the annual data fails to present what actually happened in April 2000 as the equity markets rapidly shifted from a bull to a bear market. However, a closer look in panel C reveals an interesting pattern in quarterly time series. Panel C shows a break-up to quarterly time-series. Here Q2 in 2000 stands out not just by the drop in RunUp but also due to a rapid rise in Specificity, which occurs in just few months. In Q4 1999 and Q1 2000 sample firms disclosed the use of around 20% of their IPO proceeds, whereas in Q2 and Q3 2000 firms specified on average about 45% of the proceeds. Such a drastic change cannot be explained by strategic flexibility or proprietary costs. Thus, it illustrates the impact of capital market pressure on disclosure decisions. However, the fact that Specificity follows an upward trend from 1999 to 2006 could imply that strategic maturity of high tech industries has contributed to the rise in Specificity values.

Figure 5.1.

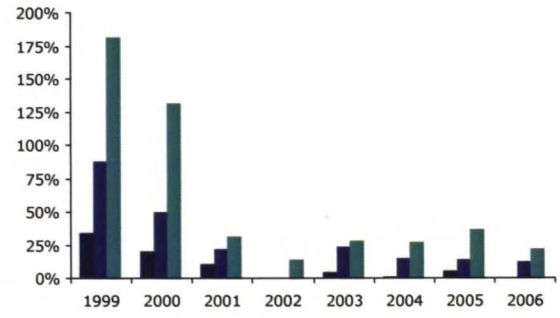
Time series overview of key variables

Panel A: Average Specificity and RunUp



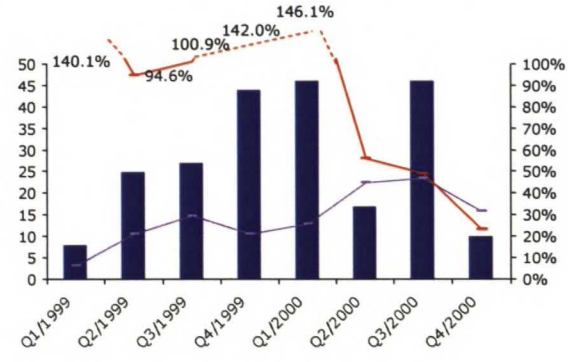
Panel A shows the total sample averages of *Specificity* and *RunUp* over time. The red line denotes RunUp, where as the lavender line stands for Specificity. RunUp and Specificity are scaled in the right axis. The blue columns mark the frequency of observations (IPOs) in each sample year (scaled in the left axis). Specificity shows a steady rise from the 20% level in 1999 to over 50% in 2006. Underpricing clearly drops to more "normal" levels in 2001. The same drastic fall is observed in IPO volume.

Panel B: RunUp by quartile



Panel B presents *RunUp* by quartiles. Thus, each year has three columns. The first one from the left represents the upper limit of the lowest 25% of RunUp observations. Median is shown by the middle column and upper 75% quartile limit is represented by the highest column on the right. Clearly, underpricing has dropped drastically. Particularly the most obscene share price run-ups have disappeared in the years following the internet boom.

Panel C: Bubble burst: Average Specificity and RunUp by quarters in 1999 and 2000



Panel C presents quarterly time series for years 1999 and 2000. Identically to panel A, red line denotes RunUp average, lavender line stands for average Specificity and the columns measure the quarterly number of sample IPOs. Data shows how in the second quarter of 2000 underpricing tumbled down from the skies. In retrospect the end of March 2000 also marked the end of an upward trend in the NASDAQ index. Note the contemporaneous increase in Specificity variable. Average Specificity is 21.2% and 25.8% in Q4 1999 and Q1 2000 but jumps to 45.0% and 47.0% in the following quarters, Q2 and Q3, respectively. This could imply that investors became more sceptical and started asking for use of proceeds information in March/April 2000. A downturn in investor sentiment could also be the cause of the drop in IPO first day performance.

RunUp has values beyond the scale of the chart. These values are presented in the value labels in the chart.

Correlations

Finally, the descriptive analysis concludes with correlations between main variables, which are presented in table 4.7. Overview on the correlations reveals that the variables are highly intertwined, which poses challenges for interpretation of statistical results. When examining correlations of Specificity it is important to also note the differences of debt and non-debt disclosure. Overall Specificity tends to be associated with firm size and age, which reflects in the correlations with Sales, Assets, Employees and Age. However, this alone does not give the whole picture of the subcategories of Specificity. Specificity-Debt fully explains why aggregate specificity is associated to size and leverage. Specificity-NonDebt is negatively correlated with sales and employees as well as Debt/TA. It is also positively correlated with dummy variables for start-up and biotech companies. Both specificity subcategories are correlated negatively with RunUp. These correlations are in line with the hypothesis that companies disclose use of proceeds more specifically in order to meet investor demand for information. Moreover, the data is in line with the assumption that investors are particularly interested in non-debt uses and have more need for information about small risky companies as well as a stronger influence on them. The need for external financing measured by variable DV/sales is positively correlated with Specificity-NonDebt, but negatively correlated with Specificity-Debt, when examining Spearman correlations. This result implies that companies that are more dependent on the external financing need to disclose more of their investment plans. On the other hand the negative correlation with Specificity-Debt shows that the companies, which need more financing, are not repaying debt, which is makes perfect sense.

Correlations of RunUp also reveal some interesting statistical links. As expected, more mature and larger companies tend to be less underpriced than their younger and smaller peers. Book-to-market could be a measure of valuation conservatism as well as tangibility of the businesses. Companies with higher book-to-market ratios clearly experience less underpricing. IPOs, where insiders are left with higher ownership stakes after the transaction, experience higher share price run-up as shown by the positive correlation of RunUp and Retained. In line with earlier research, underpricing tends to be high following periods of strong equity market performance, as shown by the positive correlation between RunUp and PrePerform. IPOs of biotech companies have shown less underpricing. On the other hand, Spearman correlation shows signs of a positive correlation between Dummy-StartUp and RunUp. The need for external financing, DV/Sales, seems to be positively correlated with RunUp, when examining Spearman correlations. Transaction costs, which comprise underwriter and lawyer fees as well as firms' own IPO marketing expenses, are negatively

associated with RunUp. It could be that companies that had to see more effort to complete the IPO were received more sceptically by the market. Alternatively it could indicate that underwriters have settled for lower fees in return for underpricing as suggested by the "profit sharing" view. IPOs by the six most prestigious investment banks have experienced higher share price run-ups on the first day of trading.

Table 4.7.

Correlation Analysis

	Sales	Assets	Employees	Age	B/M	Debt/TA	DV/Sales	Retained	TRNScost	RunUp	Bid-Ask	Pre-perform	Dummy-Profit	Dummy-TopIB	Dummy-StartUp	Dummy-Bio	Dummy-Hot	Specificity	Specificity-Debt	Specificity-NonDebt
Sales		0,563 ***	0,679 ***	0,415 ***	0,143 **	0,270 ***	-0,985 ***	-0,041	0,206 ***	-0,234 ***	-0,254 ***	-0,111 **	0,572 ***	-0,016	-0,814 ***	-0,246 ***	-0,243 ***	0,140 **	0,439 ***	-0,194 ***
Assets	0,777 ***		0,658 ***	0,261 ***	0,584 ***	0,219 ***	-0,510 ***	0,046	0,099 *	-0,396 ***	-0,145 **	-0,250 ***	0,351 ***	0,042	-0,328 ***	-0,048	-0,323 ***	0,295 ***	0,298 ***	0,015
Employees	0,649 ***	0,582 ***		0,329 ***	0,224 ***	0,302 ***	-0,623 ***	0,100 *	0,140 **	-0,163 ***	-0,106 *	-0,122 **	0,371 ***	0,012	-0,526 ***	-0,312 ***	-0,171 ***	0,199 ***	0,393 ***	-0,105 *
Age	0,323 ***	0,314 ***	0,311 ***		0,150 **	0,155 ***	-0,446 ***	-0,222 ***	0,196 ***	-0,253 ***	-0,024	-0,116 **	0,387 ***	-0,080	-0,350 ***	0,040	-0,296 ***	0,176 ***	0,218 ***	-0,026
B/M	0,322 ***	0,456 ***	0,496 ***	0,110 *		-0,074	-0,162 ***	-0,281 ***	0,134 **	-0,510 ***	0,129 **	-0,253 ***	0,109 *	-0,057	0,007	0,223 ***	-0,321 ***	0,237 ***	0,079	0,122 **
Debt/TA	0,158 **	0,199 ***	0,238 ***	0,242 ***	-0,002		-0,256 ***	-0,221 ***	-0,075	-0,067	0,052	0,078	0,247 ***	-0,046	-0,181 ***	-0,113 **	0,111 **	0,249 ***	0,533 ***	-0,039
DV/Sales	-0,081	-0,005	-0,052	-0,066	-0,010	0,067		0,068	-0,239 ***	0,297 ***	0,210 ***	0,120 **	-0,560 ***	0,057	0,783 ***	0,178 ***	0,247 ***	-0,170 ***	-0,428 ***	0,163 ***
Retained	-0,076	-0,028	-0,131 **	-0,199 ***	-0,311 ***	-0,264 ***	0,049		-0,106 *	0,313 ***	-0,065	-0,020	-0,145 ***	0,328 ***	-0,035	-0,164 ***	0,121 **	-0,245 ***	-0,296 ***	-0,092
TRNScost	0,085	0,083	0,208 ***	-0,001	0,204 ***	-0,017	-0,117 **	-0,042		-0,195 ***	-0,130 **	-0,201 ***	0,190 ***	0,036	-0,173 ***	-0,042	-0,378 ***	0,139 **	0,105 *	0,046
RunUp	-0,189 ***	-0,243 ***	-0,191 ***	-0,169 ***	-0,318 ***	-0,109 *	0,007	0,303 ***	-0,232 ***		-0,118 **	0,400 ***	-0,239 ***	0,147 ***	0,095 *	-0,240 ***	0,506 ***	-0,406 ***	-0,229 ***	-0,248 ***
Bid-Ask	-0,138 **	-0,049	-0,061	-0,059	0,129 **	0,062	0,143 **	-0,026	-0,034	-0,182 ***		0,038	-0,149 ***	-0,061	0,231 ***	0,137 **	0,119 **	0,099 *	-0,023	0,159 ***
Pre-perform	-0,163 ***	-0,181 ***	-0,164 ***	-0,059	-0,162 ***	0,079	0,058	-0,015	-0,199 ***	0,413 ***	0,042		-0,122 **	-0,028	0,071	-0,220 ***	0,655 ***	-0,156 ***	0,003	-0,119 **
Dummy-Profit	0,445 ***	0,300 ***	0,417 ***	0,282 ***	0,114 *	0,290 ***	-0,093	-0,138 **	0,160 ***	-0,199 ***	-0,120 **	-0,118 **		-0,097 *	-0,383 ***	-0,137 **	-0,225 ***	0,228 ***	0,362 ***	-0,084
Dummy-TopIB	-0,012	0,014	-0,081	-0,108 *	-0,029	-0,056	-0,027	0,316 ***	0,023	0,149 ***	-0,028	-0,040	-0,097 *		-0,012	0,010	0,019	-0,137 **	-0,131 **	-0,074
Dummy-StartUp	-0,344 ***	-0,220 ***	-0,298 ***	-0,210 ***	-0,086	-0,178 ***	0,225 ***	-0,035	-0,196 ***	0,032	0,211 ***	0,057	-0,383 ***	-0,012		0,216 ***	0,170 ***	0,005	-0,274 ***	0,208 ***
Dummy-Bio	-0,108 *	-0,065	-0,123 **	-0,058	0,104 *	-0,150 ***	0,044	-0,092	-0,076	-0,223 ***	0,114 **	-0,204 ***	-0,137 **	0,010	0,216 ***		-0,285 ***	0,143 **	-0,177 ***	0,221 ***
Dummy-Hot	-0,245 ***	-0,190 ***	-0,215 ***	-0,178 ***	-0,183 ***	0,109 *	0,063	0,056	-0,315 ***	0,486 ***	0,017	0,652 ***	-0,225 ***	0,019	0,170 ***	-0,285 ***		-0,277 ***	-0,071	-0,188 ***
Specificity	0,213 ***	0,240 ***	0,304 ***	0,228 ***	0,245 ***	0,271 ***	-0,052	-0,250 ***	0,143 **	-0,366 ***	0,142 **	-0,178 ***	0,243 ***	-0,116 **	-0,001	0,162 ***	-0,301 ***		0,511 ***	0,770 ***
Specificity-Debt	0,475 ***	0,393 ***	0,565 ***	0,431 ***	0,256 ***	0,550 ***	-0,054	-0,304 ***	0,158 ***	-0,220 ***	-0,008	-0,082	0,465 ***	-0,138 **	-0,276 ***	-0,115 **	-0,173 ***	0,536 ***		-0,002
Specificity-NonDebt	-0,131 **	-0,034	-0,098 *	-0,079	0,094	-0,124 **	-0,016	-0,048	0,040	-0,250 ***	0,172 ***	-0,142 **	-0,088	-0,026	0,220 ***	0,281 ***	-0,213 ***	0,737 ***	-0,175 ***	

*Note: correlations are marked with *, ** and *** to indicate statistical significance beyond levels of 10%, 5% and 1% (two-tailed), respectively*

Table 4.7. Presents correlations between variables for the total sample of 316 observations. The lower left corner of the matrix presents Pearson correlations. In addition to parametric Pearson correlation the sample is checked using Spearman's non-parametric rank correlation coefficients, which are presented in the upper right corner of the matrix.

4.3. Regression analysis

In order to improve the reliability of the regression analysis the test variables required certain cleaning operations. Two methods were used as a remedy for high dispersion in the distributions of test variables. First some test variables are natural logarithms of the original variable, for instance *Ln(RunUp)* denotes the logarithm of RunUp. Second, some variables had few paranormal cases that could have resulted from exceptional events or measurement error. These "outliers" are excluded from the regression analysis. For a more specific description of the cleaning operations and descriptive statistics of the regressed variables see Appendix 2.

Hypothesises I-V are tested by tobit regression of Specificity and its subcategories. Tobit regression is the right method when the distribution of the dependent variable is limited to a certain range. In this case the Specificity variables can only have values between 0 and 1, which is taken into account in the regression models.

Table 5.1 presents results from models 1-3. The first reported number in the table is the regression coefficient and below it the table shows the corresponding t-value. T-value is a measure of statistical significance of the regression coefficient. All statistically significant t-values are marked with *, ** or ***, which stand for two-tailed significance at 10%, 5% or 1% level respectively. Model 1 is a regression of Specificity with Independent variables to measure company size, risk, profitability, need for financing and retained stake of the pre-IPO shareholders. The model also has Dummy-Hot as a control variable as Specificity has arguably increased from the hot period to the cold period. Models 2 and 3 are corresponding regressions for Specificity-Debt and Specificity-NonDebt.

Results from model 1 support hypothesis I that larger companies tend to disclose more than smaller companies. This result shows in the regression coefficient of Employees. Also Sales shows some evidence of larger companies disclosing more specifically, but the coefficient of Sales variable is not significant at 10% confidence level. Hypothesis II, that riskier companies should disclose more specifically, is not supported by model 1. Variables StartUp, Bio and Bid-Ask show are not associated with Specificity. Note that Bid-Ask is included in the model as a measure of risk even though this measure is not available ex ante. Hypothesis III, which states that more profitable companies should be more eager to disclose their uses for the proceeds, is supported by model 1, where Dummy-Profit is positively associated with Specificity. According to hypothesis IV

companies with higher need for external financing tend to disclose more. Model 1 gives support to the fourth hypothesis as Deal value scaled by sales is strongly associated with higher disclosure. It should also be noted that more leveraged companies disclose more specifically, but this is wholly attributable to disclosure of plans to repay debt. Finally, theory suggests that companies, in which the pre-IPO shareholders retain a larger stake in the company appear more trustworthy to investors. Because of this hypothesis V assumes that these companies disclose less as they are not pressured to disclose more by the investors. Model 1 gives support to hypothesis V as variable Retained is negatively associated with Specificity.

Results from models 2 and 3 provide further insight into the role of Specificity-Debt and Specificity-NonDebt. Due to larger number of zero observations in the two subcategories of Specificity the statistical tests could show weaker results than for Specificity in model 1. Results indicate that much of the association between Specificity and Employees is caused by the strong link between Specificity-Debt and Employees. The second measure of firm size, namely Sales, is also associated with Specificity-Debt. Thus, it could be that larger companies are more leveraged and use more of the proceeds for debt repayments, which would explain the association between Specificity and firm size. Specificity-Debt seems to be the main reason for the association of Specificity and debt per total assets. Regression coefficient of DV/Sales is not driven by Specificity-Debt. Instead it seems that Specificity-NonDebt is more strongly associated with need for external financing. The regression coefficients of Retained in models 2 and 3 indicate that the association between Retained and Specificity is mostly driven by Specificity-Debt. However, the correlation of Retained and leverage measured by Debt/TA is negative as shown in table 4.7. Finally, from model 3 it appears that the lower Specificity values during the hot market period are mostly due to lower disclosure of non-debt items.

Table 5.1.

Tobit regression of use-of-proceeds disclosure specificity

	Total sample (N=262)		
Variable	Model 1: Specificity	Model 2: Specificity-Debt	Model 3: Specificity-NonDebt
Constant	-0.687	-0.458	-0.067
	(-0.87)	(-0.73)	(-0.07)
Ln(Age)	-0.008	-0.017	0.003
	(-0.16)	(-0.46)	(0.05)
Ln(Assets)	0.006	-0.031	0.007
	(0.09)	(-0.51)	(0.08)
LN(Sales)	0.152	0.163	0.018
	(1.41)	(1.91)*	(0.14)
Ln(Employees)	0.101	0.142	0.001
	(1.66)*	(3.01)***	(0.02)
Clean(BM)	0.230	-0.228	0.206
	(0.44)	(-0.54)	(0.34)
Clean(Debt/TA)	0.533	0.743	-0.015
	(2.68)***	(4.73)***	(-0.06)
Clean(DV/Sales)	0.081	0.032	0.058
	(2.44)**	(1.15)	(1.45)
Retained	-0.957	-1.372	-0.160
	(-1.90)*	(-3.35)***	(-0.27)
Clean(TRSNcost)	0.577	-0.360	-2.263
	(0.15)	(-0.12)	(-0.51)
Clean(Bid-Ask)	7.313	-1.957	12.494
	(1.07)	(-0.36)	(1.59)
Preperform	0.022	0.110	0.062
	(0.1)	(0.58)	(0.22)
Dummy-Profit	0.143	0.047	0.090
	(1.66)*	(0.67)	(0.89)
Dummy-TopIB	-0.067	-0.017	-0.007
	(-0.83)	(-0.25)	(-0.07)
Dummy-Bio	0.137	-0.039	0.087
	(1.17)	(-0.37)	(0.63)
Dummy-StartUp	-0.15	0.09	-0.154
	(-0.52)	(0.37)	(-0.47)
Dummy-Hot	-0.253	-0.116	-0.339
	(-2.33)**	(-1.30)	(-2.53)**

*Note: t-values are marked with *, ** and *** to indicate statistical significance beyond levels of 10%, 5% and 1% (two-tailed), respectively*

Table 5.1. shows tobit regression results for Specificity and its subcategories as the dependent variables. The table shows the regression coefficients and related t-values. Model 1 is a test the determinants of Specificity, model 2 tests Specificity-Debt and model 3 Specificity-NonDebt. Independent variables represent firm characteristics, such as size (Sales, Employees and Assets), firm age, book-to-market, leverage and profitability. Test variable also include the retained stake of pre-IPO shareholders, deal value per sales, transaction costs, equity market performance before the IPO, investment bank reputation. Also dummy variables for Biotech and start-up firms (sales < USD 10 million) are included to test whether the risk of these companies is associated with disclosure.

Table 5.2. presents models 4-6, which are formulated to test whether Underpricing could be a consequence of less specific disclosure. Hypothesis VI assumes that more specific disclosure can ameliorate underpricing. However, none of the models supports this hypothesis. Model 4 tests only the Specificity variable. Model 5 is a two step regression, where the predicted value of Specificity is one of the explanatory variables. With this technique it is possible to separate the characteristics that drive disclosure from the disclosure itself. Results from model 5 show that the aforementioned characteristics are more strongly associated with RunUp than the disclosure decision itself. Thus, results are against the hypothesis that disclosure can ameliorate underpricing. Finally model 6 tests RunUp with Specificity-Debt and Specificity-NonDebt separately, but find no statistically significant evidence of a link between disclosure and underpricing.

Underpricing is however associated with company size measured by Sales. Moreover, companies with high deal value per sales experience stronger share price run-ups. This implies that companies, which are more in need of financing, experience more underpricing. Interestingly also Retained is positively associated with underpricing. An explanation could be that when pre-IPO shareholders retain a high stake they are more concerned about the secondary market price and less concerned about the issue price. Not surprisingly, conservative valuation indicated by high book-to-market is associated with less underpricing. This could mean that RunUp is more of a measure of investor sentiment than underpricing.

Table 5.2.

Regression of price RunUp

Variable	Total sample (N=240)		
	Model 4	Model 5	Model 6
	R-Square=0.56	R-Square=0.57	R-Square=0.57
Constant	-6.318	-5.196	-5.964
	(-2.69)***	(-2.10)**	(-2.56)**
Ln(Age)	-0.100	-0.039	-0.114
	(-0.63)	(-0.24)	(-0.72)
Ln(Assets)	-0.351	-0.448	-0.353
	(-1.59)	(-1.95)*	(-1.62)
Ln(Sales)	0.904	0.758	0.825
	(2.80)***	(2.25)**	(2.56)**
Ln(Employees)	-0.072	-0.446	-0.156
	(-0.35)	(-1.35)	(-0.76)
Clean(BM)	-7.737	-7.702	-7.431
	(-4.82)***	(-4.82)***	(-4.66)***
Clean(Debt/TA)	-0.430	-1.542	-0.778
	(-0.73)	(-1.59)	(-1.28)
Clean(DV/Sales)	0.294	0.164	0.282
	(3.00)***	(1.22)	(2.90)***
Retained	2.574	4.834	3.383
	(1.69)*	(2.21)**	(2.17)**
Clean(TRNScost)	12.537	12.455	11.102
	(1.07)	(1.07)	(0.96)
Preperform	1.402	1.245	1.368
	(2.17)**	(1.91)*	(2.14)**
Dummy-Profit	-0.233	-0.576	-0.267
	(-0.88)	(-1.61)	(-1.01)
Dummy-TopIB	0.281	0.401	0.302
	(1.17)	(1.58)	(1.27)
Dummy-Bio	-0.389	-0.876	-0.416
	(-1.08)	(-1.78)*	(-1.17)
Dummy-StartUp	-0.527	-0.384	-0.513
	(-0.63)	(-0.46)	(-0.62)
Dummy-Hot	0.447	0.935	0.410
	(1.38)	(1.99)**	(1.27)
Specificity	-0.101	-0.139	
	(-0.26)	(-0.36)	
P(Specificity)		2.840	
		(1.43)	
Specificity-Debt			1.024
			(1.51)
Specificity-NonDebt			-0.420
			(-1.02)

*Note:t-values are marked with *, ** and *** to indicate statistical significance beyond levels of 10%, 5% and 1% (two-tailed), respectively*

4.4. *Interpretation of the results*

The results reveal certain characteristics which are associated with disclosure of use of proceeds. However, when interpreting the results one should keep in mind that the primary driver of what is disclosed is determined by how the proceeds are used. In other words companies disclose where they are about to invest the capital raised in the IPO. Thus, tests of use of proceeds disclosure may in fact be more of tests of how the money is invested. Despite this it is assumed that most managers have an idea of how they will invest the proceeds but only part of their plans is revealed in the prospectus. This could be due to costs of disclosure or merely because the plans may change and prospectus disclosure commits the company to invest as is written.

Results give some support to hypothesis I that larger companies tend to disclose more of their investment plans for the proceeds. This is reflected in mostly in the number of employees. Results for sales show weak evidence of the same phenomenon. As discussed in prior accounting research (Raffournier 1995), larger companies might have more prudent investment processes, which enables them to know where they should invest the raised capital. Smaller companies on the other hand might be more willing to retain full flexibility regarding the investments. It could also be that the competitive position of smaller companies is tighter and thus, the proprietary costs of disclosure are higher for these companies. An alternative explanation is that larger companies are more leveraged, as shown in the correlation table, and therefore disclose more debt repayments as suggested by model 2.

Results show no statistically significant evidence of more risky (biotech and start-up) companies disclosing more. Bid-ask spread is included in the analysis as an ex ante measure for risk but neither this measure is associated with disclosure specificity. It may be that the chosen measures are insufficient measures for risk. However, it may also be that riskier companies would like to please investors by disclosing their investment plans but are hesitant to do so due to their higher need for strategic flexibility. Moreover, it can be argued that start-up and biotech companies are more exposed to proprietary costs and therefore, are reluctant to disclose more information. Finally, companies that are more risky are probably operating in a dynamic environment and therefore, cannot commit much of the proceeds in advance.

Profitable companies tend to inform better about their investment plans than their loss-making peers as expected in hypothesis III. This result could indicate that loss-making companies needed the capital to cover their losses. Using the proceeds to cover their losses is something that the issuers

probably want to keep quiet about and, thus they have less to tell about use of proceeds. It could also be that profitable companies know better where they wish to invest the money. Or, as expected by Raffournier, it could be that managers of profitable companies are more proud to disclose how they run their companies.

Hypothesis IV that companies more in need of the financing tend to disclose more is supported by statistical results. This is illustrated by the association of deal value per sales variable and specificity. Also more leveraged companies are more specific about their plans but this is fully due to their intent to repay debt. Companies with high dependency on the IPO financing are naturally willing to disclose more in order to get the financing. As argued by Raffournier disclosure may help to solve monitoring problems, which are particularly high when the company raises a high amount of capital compared to sales of its current operations.

Retained stake of pre IPO shareholders is found to be negatively associated with disclosure as expected in hypothesis V. The hypothesis is based on the assumption that when the pre IPO shareholders remain as the main owners of the company there are less agency problems. On the other hand when they sell a large proportion of their shares the company should disclose more specifically in order to ameliorate agency problems. However, it seems that the result is mostly due to the fact that companies with high retained stake use less proceeds for debt repayment. Correlation analysis also shows that companies with high retained stake have less debt in the balance sheet before the IPO. Thus, retained stake may not be associated with lower propensity to disclose investment plans but merely associated with less leverage and less debt repayment.

When it comes to analysis of consequences of use of proceeds disclosure, this thesis finds no evidence of lower underpricing to IPOs in which more is disclosed. This result differs from the results of Leone, Rock and Willenborg (2007). The reason could be that the underpricing of high tech companies, particularly during the hot market was so enormous for other reasons than disclosure. Any small effects that disclosure might have are lost behind other reasons for the large differences in underpricing. Other factors such as investor sentiment seem to have more explanatory power on underpricing in the selected sample. Thus, it can be argued that within the sample IPOs prime reason for underpricing has not been information asymmetry. Based on the results of this thesis and prior research agency theory and behavioural finance related explanations seem stronger explanatory factors for IPO underpricing.

5. SUMMARY AND CONCLUSIONS

5.1. Summary

The purpose of this thesis is to examine the determinants and consequences of disclosure of use of proceeds in the IPO prospectus. The prime determinants tested are company size, company risk, profitability, need for external financing and ownership structure. Regarding the consequences of disclosure, this thesis hypothesises that companies that disclose more specific information suffer less underpricing.

The literature review is structured under three main themes; corporate disclosure, IPOs and IPO prospectus disclosure. There is a vast body of prior research regarding corporate disclosure as well as IPOs. Information asymmetry poses adverse selection problems in the capital markets, particularly regarding IPOs (e.g. Rock, 1986). Reporting and disclosure policies can help to solve the adverse selection problem as suggested by agency theory. However, the managers have several other incentives to disclose information. Prior research (Raffournier, 1995) presents several possible determinants of disclosure, which include company size, leverage, profitability, ownership structure, internationality and industry type. Underpricing is a widely documented phenomenon in the IPO literature that stands for the share price appreciation on the first day of trading. The IPO literature also finds that the IPO market is highly cyclical as IPO volume, underpricing and the general equity market move hand-in-hand. Theory on the reasons of underpricing offers many explanations, the most traditional being information asymmetry and adverse selection problem (e.g. Rock, 1986). However, a clear theory on IPO underpricing has not emerged yet.

The research design is constructed around 316 high-tech company IPOs on NASDAQ 1999-2006. Based on different market conditions and regulatory changes (Sarbanes-Oxley) two periods are examined separately: the hot market from January 1999 to March 2000 and the cold market from October 2000 to December 2006. The main test variable, Specificity, is constructed based on information on the use of proceeds section in the company IPO prospectuses. Specificity is the percentage amount of the IPO net proceeds that is earmarked for a specific purpose. The main statistical test method for examining the determinants of Specificity is tobit regression. Method for examining whether disclosure can ameliorate underpricing is OLS regression including a two-step model with the expected value of Specificity as a dependent variable.

The results show that larger companies tend to disclose more specifically as do companies with more need for the external financing. In addition, IPO prospectuses of companies, in which the pre IPO owners have retained a lower stake, need to disclose more specifically. According to expectations the results also show evidence of more profitable companies disclosing more specifically their investment plans. Also more leveraged companies disclose more specifically but this seems to be only because they intend to use the proceeds for debt repayments. Also regarding size and retained stake the results might be biased due to the association with higher debt repayments and not capital expenditures and other investments. Contrary to the results of Leone, Rock and Willenborg (2007) this thesis finds no association between disclosure specificity and underpricing. This may be due to the high tech sector and particularly strong variation in underpricing due to other reasons than adverse selection problem. Results clearly show that underpricing has been higher and specificity has been lower during the hot period.

5.2. Discussion of research findings

The results support the general view that company size, leverage, profitability, ownership structure and need for financing are determinants of disclosure. Thus, the results are in line with prior understading on the agency and proprietary cost theories. The results can help investors to understand the disclosure decisions of companies planning an IPO. If a company remains entirely vague about the use of proceeds it may be that the managers' don't want the use to be disclosed to the public. Moreover, the results can have practical relevance for a company writing an IPO prospectus. Knowing the determinants of disclosure can help to benchmark the disclosure decisions against a relevant peer group.

5.3. Limitations and weaknesses

The Specificity measure has the problem that companies can only disclose what they know. Thus, instead of voluntary disclosure Specificity may be more of a measure of strategic and operational maturity and predictability of the business. This thesis uses a two step regression, when examining the association of disclosure and underpricing. This method helps to separate the underlying company characteristics from the decision to disclose.

The chosen measure captures only a very specific piece of disclosure. Thus the results may not be extrapolated to disclosure policy as a whole. However, it may be that some companies are

consistently more specific about their disclosure than other companies. Despite this the results of this thesis apply only to the narrow piece of disclosure.

When examining the results of Specificity and its subcategories it is seen that many of the determinants are more associated with Specificity-Debt than with Specificity-NonDebt. Thus, it may be that the association of the determinants with higher leverage leads to high correlation with Specificity-Debt. This is because planned debt repayments are easy to disclose and thus, are usually disclosed when planned. Therefore, the results for real investment plans are weaker than indicated by the Specificity measure. Another problem is that the statistical significance of the two subcategories of specificity is lower than the significance of Specificity due to higher number of zero observations.

5.4. Suggestions for future research

Future research could apply the research method and variables to a broad sample of industries. Moreover, the sample could be selected so that it does not include as high variation regarding underpricing. Moreover, a further study could compare high tech companies with other sectors to find out whether they differ due to higher proprietary costs and other characteristics. In addition, more research could be done on the consequences of use of proceeds disclosure. Additional research could examine Specificity's association with long term performance, secondary market volatility or analyst following. As the disclosure measure used in this thesis is so narrow, additional research could use a broad index to measure prospectus disclosure. The index could include intellectual capital as done by Bukh, Nielsen, Gormsen and Mouritsen (2004).

LIST OF REFERENCES

Aboody, D. and Kasznik, R. 2000. CEO Stock option awards and the timing of corporate voluntary disclosures. *Journal of Accounting and Economics, Vol. 29, pages 79-100*

Akerlof, G. A. 1970. The market for "lemons": Quality uncertainty and the market mechanism. *The Quarterly Journal of Economics, Vol. 84, No. 3, pages 488-500.*

Allen, F. and Faulhaber, G. 1989. Signaling by underpricing in the IPO market. *Journal of Financial Economics*, Vol. 23 pages 303-323.

Amihud, Y. and Mendelson, H. 1986. Asset pricing and the bid-ask spread. *Journal of Financial Economics, Vol. 17, pages 223-249.*

Amihud, Y. and Mendelson, H. 1988. Liquidity and asset prices: financial management implications. *Financial Management, Vol. 17, pages 5-15*

Amir, E. and Lev, B., 1996. Value-relevance of nonfinancial information: the wireless communications industry. *Journal of Accounting and Economics, Vol. 22, pages 3-30.*

Barth, M.E., Hutton, A.P. 2004. Analyst earnings forecast revisions and the pricing of accruals. *Review of Accounting Studies, Vol. 9, pages 59-96.*

Barry, C. and Brown, S. 1985. Differential information and security market equilibrium. *Journal of Financial and Quantitative Analysis, Vol. 20, pages 407-422.*

Beatty, R. 1989. Auditor reputation and the pricing of initial public offerings. The Accounting Review, Vol. 64, No. 4

Beatty, R. P. and Ritter, J.R. 1986. Investment banking, reputation, and the underpricing of initial public offerings. *Journal of Financial Economics, Vol. 15, pages 213-232.*

Benveniste, L.M. and Spindt P. A. 1989. How investment bankers determine the offer price and allocation of new issues. *Journal of Financial Economics, Vol. 24, pages 343-361*

Bhushan, R., 1989. Firm characteristics and analyst following. *Journal of Accounting and Economics, Vol. 11, pages 255-275.*

Booth, J.R. and Chua, L. 1996. Ownership dispersion, costly information, and IPO underpricing. *Journal of Financial Economics, Vol. 41, pages 291-310.*

Botosan, C. 1997. Disclosure level and the cost of equity capital. *The Accounting Review, Vol. 72, pages 323-349.*

Botosan, C. 2006. Disclosure and the cost of capital: what do we know? *Accounting and Business Research, International Accounting Policy Forum, pages 31-40.*

Botosan, C. and Plumlee, M. 2002. A re-examination of disclosure level and the expected cost of equity capital. *Journal of Accounting Research, Vol. 40, pages 21-40.*

Botosan, C.A., Plumlee, M. and Xie, Y. 2004. The Role of Information Precision in Determining the Cost of Equity Capital. *Review of Accounting Studies, Vol. 9, pages 233-259.*

Brennan, N. 1999. Voluntary disclosure of profit forecasts by target companies in takeover bids. *Journal of Business Finance & Accounting, Vol. 26, pages 883-917*

Brown, P., Foster, G. and Noreen E. 1985. Security Analyst Multi-Year Earnings Forecasts and the Capital Market. *American Accounting Association*

Brown, L.D., Hagerman, R.L, Griffin, P.A., Zmijewski M.E. 1987. Security analyst superiority relative to univariate time-series models in forecasting quarterly earnings. *Journal of Accounting and Economics Vol. 9, pages 61-87.*

Bukh, P.,N., Nielsen, C., Gormsen, P., and Mouritsen, J. 2005 . Disclosure of Information on Intellectual Capital in Danish IPO Prospectuses. *Accounting, Auditing & Accountability Journal.* Vol. 18 No. 6. 2005: pages 713-732

Bushman, R.M. 1991. Public disclosure and the structure of private information markets. *Journal of Accounting Research, Vol. 29, No. 2, pages 261-276.*

Bushman, R.M., Piotroski, J.D., and Smith, A.J. 2003. What Determines Corporate Transparency? *Journal of Accounting Research Vol. 42, No. 2, pages 207-252*

Carter, R., Dark, F. and Singh, A. 1998. Underwriter reputation, initial returns, and the long-run performance of IPO stocks. *The Journal of Finance, Vol. 53, No. 1, pages 285-311.*

Chemmanur, T.J. 1993. The pricing of initial public offerings: A dynamic model with information production. *The Journal of Finance, Vol. 48, No. 1, pages 285-304.*

Choi, F.D. 1973. Financial disclosure and entry to the European capital market. *Journal of Accounting Research, Vol. 11, No. 2, pages 159-175.*

Clarkson, P., Guedes, J. and Thompson, R. 1996. On the diversification, observability, and measurement of estimation risk. *Journal of Financial and Quantitative Analysis, Vol. 31, No. 1, pages 69-84.*

Clarkson, P., Dontoh, A. Richardson, G. Sefcik, S. 1991. Retained ownership and the valuation of initial public offerings: Canadian evidence. *Contemporary Accounting Research, Vol. 8, No. 1, pages 115-131.*

Coles, J. and Loewenstein U. 1988. Equilibrium pricing and portfolio composition in the presence of uncertain parameters. *Journal of Financial Economics, Vol. 22, pages 279-303.*

Coles, J., Loewenstein, U. and Suay, J. 1995, On equilibrium pricing under parameter uncertainty. *Journal of Financial and Quantitative Analysis, Vol. 30, pages 347-364.*

Comaford-Lynch, C. Preparing for financial due diligence. Business Week article November 5th 2007.

Copeland, T.E. and Galai, D. 1983. Information effects on the bid-ask spread. *The Journal of Finance, Vol. 38, No.5, pages 1457-1469.*

Core, J.E. 2001. A review of the empirical disclosure literature: discussion. *Journal of Accounting and Economics*, 31: 441-456.

Cornelli, F., Goldreich, D. and Ljungqvist, A. 2006. Investor sentiment and pre-IPO markets. *The Journal of Finance, Vol. 61, No. 3, pages 1187-1216*

Coval, J.D. and Moskowitz, T.J. 1999. Home bias at home: Local equity preference in domestic portfolios. *The Journal of Finance, Vol. 54, No. 6, pages 2045-2073.*

Darrough, M.N. 1993. Disclosure policy and competition: Cournot vs. Bertrand. *The Accounting Review, Vol. 68, No. 3, pages 534-561.*

Darrough, M.N. and Stoughton, N.M. 1990. Financial disclosure policy in an entry game. *Journal of Accounting and Economics, Vol. 12, pages 219-243.*

Dechow, P., Hutton, A, and Sloan, R., 2000. The relation between analysts' forecasts of long-term earnings growth and stock price performance following equity offerings. *Contemporary Accounting Research, Vol. 17, pages 1-32.*

Demers, E. and Lewellen, K., 2003. The marketing role of IPOs: Evidence from internet stocks, *Journal of Financial Economics, Vol. 68, pages 413-437.*

Demsetz, H. 1968. The cost of transacting. *The Quarterly Journal of Economics, Vol. 82, No. 1, pages 33-53.*

Diamond, D.W. 1985. Optimal release of information by firms. *The Journal of Finance, Vol. 40. No. 4, pages 1071-1094.*

Diamond, D. and Verrecchia, R. 1991. Disclosure, liquidity and the cost of capital. *The Journal of Finance, Vol. 46, pages 1325-1360*

Downes, D.H. and Heinkel, R. 1982. Signaling and the valuation of unseasoned new issues. *The Journal of Finance, Vol. 37, No. 1, pages 1-10.*

Drake, P.D. and Vetsuypens, M.R. 1993. IPO Underpricing and Insurance against Legal Liability. *Financial Management, Vol. 22, No. 1, pages 64-73.*

Dye, R. 2001. An evaluation of "essays on disclosure" and the disclosure literature in accounting. *Journal of Accounting and Economics, Vol. 32, pages 181-235.*

Easley, D. and O'Hara, M. 2004. Information and the cost of capital. The Journal of Finance, *Vol. 59, Issue 4, pages 1553-1584.*

Feltham, G.A. and Xie, J.Z. 1992. Voluntary financial disclosure in an entry game with continua of types. *Contemporary Accounting Research, Vol. 9, No. 1, pages 46-80.*

Foster, G., 1979. Briloff and the capital market. Journal of Accounting Research, Vol. 17, pages 262-274.

Foster, G., 1987. Rambo IX: Briloff and the capital market. *Journal of Accounting, Auditing and Finance, Vol. 2, pages 409-431.*

Francis, J., Philbrick, D. and Schipper, K. 1994. Shareholder litigation and corporate disclosures. *Journal of Accounting Research, Vol. 32, No. 2, pages 137-164.*

Francis, J., Soffer, L., 1997. The relative informativeness of analysts' stock recommendations and earnings forecast revisions. *Journal of Accounting Research, Vol. 35, pages 193-212.*

Gelb, D. and Zarown, P. 2002. Corporate disclosure policy and the informativeness of stock prices. *Review of Accounting Studies, Vol. 7, pages 33-52*

Gigler, F. 1994. Self-enforcing voluntary disclosures. *Journal of Accounting Research, Vol. 32, No. 2, pages 224-240.*

Glosten, L. and Milgrom, P, 1985. Bid ask and transaction prices in a specialist market with heterogeneously informed traders. *Journal of Financial Economics, Vol. 14, pages 71-100.*

Grinblatt, M. and Keloharju, M. 2001. How distance, language, and culture influence stockholdings and trades. *The Journal of Finance, Vol. 61, No. 3, pages 1053-1073.*

Guo, R.J., Lev, B. Shi, C. 2006. Explaining the short and long term IPO anomalies in the US by R&D. *Journal of Business Finance & Accounting, Vol. 33, No. 3, pages 550-579.*

Guo, R. J., Lev, B., and Zhou, N. 2004. Competitive Costs of Disclosure by Biotech IPOs. *Journal of Accounting Research* 42: pages 319-355.

Hail, L. 2002. The impact of voluntary corporate disclosures on the ex-ante cost of capital for Swiss firms. *The European Accounting Review, Vol. 11, No. 4, pages 741-773.*

Han, J.C. and Wang, S. 1998. Political Costs and Earnings Management of Oil Companies during the 1990 Persian Gulf Crisis. *The Accounting Review*, Vol. 73, No. 1, pages 103-117

Hassell, J., Jennings., R., 1986. Relative forecast accuracy and the timing of earnings forecast announcements. *The Accounting Review, Vol. 61, pages 58-76.*

Healy, P., Hutton, A. and Palepu, K. 1999. Stock performance and intermediation changes surrounding sustained increases in disclosure. *Contemporary Accounting Research, Vol. 16, pages 485-520.*

Healy, P.M., and Palepu, K.G. 2001. Information Asymmetry, Corporate Disclosure, and the Capital Markets: A Review of the Empirical Disclosure Literature. *Journal of Accounting and Economics*, 31: 405-440.

Helwege, J. and Liang, N. 2004. Initial Public Offerings in Hot and Cold Markets. *Journal of Financial and Quantitative Analysis*, Vol 39. No. 3, pages 541-569

Hooghiemstra, R. 2000. Corporate Communication and Impression Management – New Perspectives Why Companies Engage in Corporate Social Reporting. *Journal of Business Ethics, Vol. 27, No 1-2, pages 55-68*

Hribar, P. 2004. Discussion of competitive costs of disclosure by biotech IPOs. *Journal of Accounting Research, Vol. 42, No. 2, pages 357-364.*

Hughes, P.J., 1986. Signaling by direct disclosure under asymmetric information. *Journal of Accounting and Economics, Vol. 8, pages 119-142.*

Ibbotson, R.G. and Jaffe, J.F. 1975. "Hot issue" markets. *The Journal of Finance, Vol. 30. No. 4., pages 1027-1042.*

Ibbotsson, R.G., Sindelar, J.L. and Ritter, J.R. 1994. The market's problems with the pricing of initial public offerings. *Journal of Applied Corporate Finance, Spring 1994, pages 66-74.*

Jensen, M., Meckling, W., 1976. Theory of the firm: managerial behavior, agency costs and ownership structure. *Journal of Financial Economics, Vol. 3, pages 305-360.*

Jog, V. and McConomy, B. J. 2003. Voluntary disclosure of Management Earnings Forecasts in IPO Prospectuses. *Journal of Business Finance & Accounting,* Vol. 30 pages 125-167

Kim, O. and Verrecchia, R. 1991. Trading volume and price reactions to public announcements. *Journal of Accounting Research, Vol. 29, No. 2, pages 302-321.*

Kim, O. and Verrecchia, R.E. 1994. Market liquidity and volume around earnings announcements. *Journal of Accounting and Economics, Vol. 17, pages 41-67.*

Klein, R. and Bawa, V. 1977. The effect of limited information and estimation risk on optimal portfolio diversification. Journal of Financial Economics, Vol. 5, pages 89-111.

Lambert, R.A. 2001. Contracting theory and accounting. *Journal of Accounting and Economics, Vol. 32, pages 3-87.*

Lambert, R.A., Leuz C. and Verrecchia R.E. 2007. Accounting Information, Disclosure, and the Cost of Capital. *Journal of Accounting Research, Vol. 45, No. 2, pages 385-420.*

Lamont, O. and Thaler R. H. 2003. Can the market add and substract? Mispricing in tech stock carve-outs. *Journal of Political Economy, Vol. 111, No. 2, pages 227-268*

Lang, M., Lundholm, R., 1996. Corporate disclosure policy and analyst behavior. The Accounting Review, Vol. 71, pages 467-493.

Lang, M, and Lundholm, R. 2000. Voluntary disclosure and equity offerings: reducing information asymmetry or hyping the stock? *Contemporary Accounting Research, Vol. 17, No. 4, pages 623-662.*

Leone, A.J., Rock, S., and Willenborg, M. 2007. Disclosure of Intended Use of Proceeds and Underpricing in Initial Public Offerings. *Journal of Accounting Research,* Vol. 45. (No. 1)

Leuz, C. and Verrecchia R. E. 2000. The Economic Consequences of Increased Disclosure. *Journal of Accounting Research, Vol. 38, Supplement, pages 91-124.*

Lin, H. and McNichols, M. 1998. Underwriting relationships, analysts' earnings forecasts and investment recommendations. *Journal of Accounting and Economics, Vol. 25, pages 101-127.*

Ljungqvist, A. Nanda, V. and Singh R. 2006. Hot markets Investor Sentiment and IPO Pricing. *Journal of Business*, Vol. 79. No. 4

Ljungqvist, A. and Wilhelm, W. J. 2003. IPO Pricing in the Dot-Com Bubble. *The Journal of Finance, Vol. 58 No. 2. pages 723-752*

Ljungqvist, A. and Wilhelm, W. J. 2005. Does prospect theory explain IPO market behaviour? *The Journal of Finance, Vol. 60, No. 4. pages: 1759-1790.*

Loewenstein, G., Weber, E.U., Hsee, C.K. and Welch, N. 2001. Risk as feelings. Psychological Bulletin, Vol. 127, No. 2., pages 267-286.

Loughran, T. and Ritter, J. R. 2002 Why don't issuers get upset about leaving money on the table in IPOs? *Review of Financial Studies,* Vol. 15, pages 413-443.

Loughran, T. and Ritter, J. R. 2004. Why has IPO underpricing changed over time? *Financial Management, Vol. 33 Issue 3, pages 5-37*

Lowry, M. 2001. Why does IPO volume fluctuate so much? *Journal of Financial Economics,* Vol. 67, pages 3-40

Lowry, M. and Schwert, W. 2002. IPO market cycles: bubbles or sequential learning? *The Journal of Finance Vol. 57, No. 3, pages 1171-1200.*

Lowry, M. and Shu, S. 2002. Litigation risk and IPO underpricing. *Journal of Financial Economics Vol. 65, Issue 3, pages 309-335*

Lucchetti, A., 1999, "SEC Probes Rates Funds Firms Pay for Commissions," Wall Street Journal, Sept. 16, C1.

Lundholm, R.J. 1988. Price-signal relations in the presence of correlated public and private information. *Journal of Accounting Research, Vol. 26, No.1, pages 107-118.*

Lundholm, R.J. 1991. Public signals and the equilibrium allocation of private information. *Journal of Accounting Research, Vol. 29, No.2, pages 322-349.*

McNichols, M. 1989. Evidence of Informational Asymmetries from Management Earnings Forecasts and Stock Returns. *The Accounting Review, Vol. 64, No. 1. pages 1-27.*

Miller, M. H., Rock, K. 1985. Dividend policy under asymmetric information. *The Journal of Finance, Vol. 40, No. 4, pages 1031-1051.*

Murray, A. Sinclair, D. Power, D. and Gray, R. 2006. Do financial markets care about social and environmental disclosure? - Further evidence and exploration from the UK. *Accounting, Auditing & Accountability Journal Vol. 19 No. 2, pages 228-255.*

Myers, S.C and Majluf, N.S. 1984. Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics, Vol. 13, pages 187-221.*

Newman, P. and Sansing, R. 1993. Disclosure policies with multiple users. *Journal of Accounting Research, Vol. 31, No. 1, pages 92-112.*

Noe. C.F. 1999. Voluntary disclosures and insider transactions. *Journal of Accounting and Economics, Vol. 27, pages 305-326*

Pagano, M., Panetta, F. and Zingales, L. 1998. Why do companies go public? An empirical analysis. *The Journal of Finance, Vol. 53, No. 1, pages 27-64.*

Palepu, K.G. 1986. Predicting takeover targets: A methodological and empirical analysis. *Journal of Accounting and Economics, Vol. 8, pages 3-35.*

Poshakwale, S. and Courtis, J. 2005. Disclosure level and cost of equity capital: evidence from the banking industry. *Managerial and Decision Economics, Vol. 26, pages 431-444.*

Pownall, G. and Waymire, G., 1989. Voluntary disclosure credibility and securities prices: evidence from management earnings forecasts. *Journal of Accounting Research, Vol. 27, pages 227-246.*

Raffournier, B. 1995. The determinants of voluntary financial disclosure by Swiss listed companies. *The European Accounting Review, Vol 4, Issue 2, pages 261-280*

Rajan, R. and Servaes H., 1997. Analyst following of initial public offerings. *The Journal of Finance, Vol. 52, No. 2, pages 507-529*

Richardson, A. and Welker, M. 2001 Social disclosure, financial disclosure and the cost of equity capital. *Accounting, Organizations and Society, Vol. 26,* pages 597-616.

Ritter, J.R. 1984. The "hot issue" market of 1980. *The Journal of Business, Vol. 57, No. 2, pages 215-240.*

Ritter, J.R. 1991. The long-run performance of initial public offerings. *The Journal of Finance, Vol. 46, No. 1, pages 3-27.*

Ritter, J. R. 2003. Differences between European and American IPO markets. *European Financial Management,* Vol. 9 No. 4 pages 421-434

Ritter, J.R. and Welch, I. 2002. A review of IPO activity, pricing and allocations. *The Journal of Finance, Vol. 57, No.4, pages 1795-1828.*

Rock, K. 1986. Why new issues are underpriced. *Journal of Financial Economics, Vol. 15, pages 187-212.*

Schrand, C., and Verrecchia, R. 2005. Information Disclosure and Adverse Selection Explanations for IPO Underprising. *Working paper, University of Pennsylvania.*

Shleifer, A. and Vishny R.W., V. 1997. The limits of arbitrage. *Journal of Finance, Vol. 52, pages 35-55.*

Siegfried, J.J.1975. The determinants of antitrust activity. *Journal of Law and Economics, Vol. 18, No. 2, pages 559-574*

Skinner, D.J. 1994. Why firms voluntarily disclose bad news. *Journal of Accounting Research, Vol. 32, No. 1, pages 38-60.*

Skinner, D.J. 1997. Earnings disclosures and stockholder lawsuits. *Journal of Accounting and Economics, Vol. 23, pages 249-282.*

Spence, A.M.1973. Job Market Signaling. *Quarterly Journal of Economics, Vol. 87, No. 3, pp. 355-374.*

Stoughton, N., Wong, K. and Zechner J. 2001. IPOs and product quality. *Journal of Business, Vol. 74, No. 3, pages 375-408.*

Tasker, S. 1998. Bridging the information gap: quarterly conference calls as a medium for voluntary disclosure. *Review of Accounting Studies, Vol. 3, pages 137-167.*

Trueman, B. 1986. Why do managers voluntarily release earnings forecasts? *Journal of Accounting and Economics, Vol. 8, pages 53-71.*

Verrecchia, R.E. 1982. Information acquisition in a noisy rational expectations economy. *Econometrica, Vol. 50, No.6, pages 1415-1430.*

Verrecchia, R.E. 1983. Discretionary disclosure. *Journal of Accounting and Economics, Vol. 5, pages 179-194.*

Verrecchia, R. E. 2001. Essays on disclosure. *Journal of Accounting and Economics* Vol. 32, pages 97-180

Wagenhofer, A. 1990. Voluntary disclosure with a strategic opponent. *Journal of Accounting and Economics, Vol. 12, pages 341-363.*

Warner, J., Watts, R. and Wruck, K. 1988. Stock prices and top management changes. *Journal of Financial Economics, Vol. 20, pages 461-492.*

Watts, R. and Zimmerman, J. 1978. Towards a positive theory of the determination of accounting standards. *The Accounting Review, Vol. 53, No. 1, pages 112-134.*

Waymire, G., 1986. Additional evidence on the accuracy of analyst forecasts before and after voluntary management earnings forecasts. *The Accounting Review, Vol. 61, 129-143.*

APPENDICES

Appendix 1: Sample selection

	Hot period	Cold period	Total sample[1]
Initial sample from Dealogic	390	269	836
- Deal size USD 75-200 million	-229	-153	-489
Observations after deal size constraint	161	116	347
- Exclude all ADS offerings	-11	-13	-31
Final sample	**150**	**103**	**316**

1) Total sample includes all corresponding IPOs during 1999-2006 including the 6 month period between hot and cold period.

Initial sample is collected from Dealogic by searching the following SIC codes for high tech sector: HEDR or COMF or COMV or CONT or COPC or COPR or COCM or COMD or COMS or COSC or COSE or COSO or COSR or MAEL or TECA or TEEQ or TERA or TESA or TETE or TEWI or TESE or CPOS or HEBI or HEMS.

Appendix 2: Detailed information of test variables

Description of the data collection protocol for use of proceeds disclosure variables

Disclosure is examined by collecting information on how many percentages of the proceeds to the issuer company are earmarked to specific investment targets. Working capital and general corporate purposes does not qualify for a specific purpose. Moreover, a statement that lists many specific expenditure targets, but gives an aggregate amount to be used for them is not accounted for. Ranges are accounted for at lower end of the range.

Cleaning operations for regression analysis

Variable	Nbr. of cases	Skewness	Kurtosis	Operation used	Test variable	Nbr. of cases	Skewness	Kurtosis
RunUp	316	2.200	6.922	Natural logarithm	Ln(RunUp)	283	-1.188	1.507
Age	316	4.487	26.906	Natural logarithm	Ln(Age)	314	0.322	0.288
Assets	316	5.139	40.195	Natural logarithm	Ln(Assets)	316	0.203	0.330
Employees	316	3.511	13.717	Natural logarithm	Ln(Employees)	316	0.510	0.714
BM	269	4.150	27.479	Exclude over 0.5	Clean(BM)	265	1.793	3.634
Debt/TA	316	2.136	4.997	Exclude over 1.2	Clean(Debt/TA)	309	1.642	1.726
DV/Sales	302	12.925	189.111	Exclude over 10	Clean(DV/Sales)	206	0.844	-0.300
IPOProfit	268	6.546	54.831	Natural logarithm	Ln(IPOProfit)	268	-0.172	0.103
TRNScost	316	1.982	5.697	Excl. over 13%	Clean(TRNScost)	312	1.390	2.423
Sales	316	5.484	48.174	Natural logarithm	Ln(Sales)	302	-0.672	0.771
BidAsk	310	1.263	2.080	Excl. over 3.5%	Clean(BidAsk)	308	1.018	0.929

Appendix 3: List of IPOs in the sample

Company name	Date	Company name	Date
Isilon Systems Inc	14-Dec-06	SSA Global Technologies Inc	25-May-05
Affymax Inc	14-Dec-06	Aspreva Pharmaceuticals Corp	03-Mar-05
Double-Take Software Inc	14-Dec-06	Arbinet-thexchange Inc	16-Dec-04
IPG Photonics Corp	12-Dec-06	PortalPlayer Inc	18-Nov-04
Allot Communications Ltd	15-Nov-06	PRA International	17-Nov-04
Canadian Solar Inc	08-Nov-06	InPhonic Inc	15-Nov-04
Orbcomm Inc	02-Nov-06	Telvent SA	21-Oct-04
Globalstar Inc	01-Nov-06	Theravance Inc	04-Oct-04
Optium Corp	26-Oct-06	Ness Technologies Inc	29-Sep-04
Acme Packet Inc	12-Oct-06	JAMDAT Mobile Inc	28-Sep-04
CommVault Systems Inc	21-Sep-06	MannKind Corp	27-Jul-04
DivX Inc	21-Sep-06	Kanbay International Inc	21-Jul-04
Riverbed Technology Inc	20-Sep-06	Idenix Pharmaceuticals Inc	21-Jul-04
Omniture Inc	27-Jun-06	Xyratex Ltd	23-Jun-04
Houston Wire & Cable Co	14-Jun-06	Blackboard Inc	17-Jun-04
Verigy Ltd	12-Jun-06	Leadis Technology Inc	15-Jun-04
CPI International Inc	27-Apr-06	PowerDsine Ltd	09-Jun-04
Corel Corp	25-Apr-06	Cytokinetics Inc	29-Apr-04
Visicu Inc	04-Apr-06	Barrier Therapeutics Inc	28-Apr-04
Nextest Systems Corp	21-Mar-06	SiRF Technology Holdings Inc	21-Apr-04
Eagle Test Systems Inc	08-Mar-06	Cherokee International Inc	19-Feb-04
Ntelos Holdings Corp	08-Feb-06	Atheros Communications Inc	11-Feb-04
SMART Modular Technologies (WWH) Inc	02-Feb-06	Corgentech Inc	11-Feb-04
Altus Pharmaceuticals Inc	25-Jan-06	Staktek Holdings Inc	05-Feb-04
Traffic.com Inc	24-Jan-06	Renovis Inc	04-Feb-04
DealerTrack Holdings Inc	12-Dec-05	GTX Inc	02-Feb-04
SunPower Corp	16-Nov-05	Eyetech Pharmaceuticals Inc	29-Jan-04
Saifun Semiconductor Ltd	08-Nov-05	NPTest Holding Corp.	10-Dec-03
iRobot Corp	08-Nov-05	Open Solutions Inc	25-Nov-03
WebMD Health Corp	28-Sep-05	Nexstar Broadcasting Group Inc	24-Nov-03
Taleo Corp	28-Sep-05	Callidus Software Inc	19-Nov-03
IKANOS Communications Inc	21-Sep-05	Tessera Technologies Inc	12-Nov-03
Coley Pharmaceutical Group Inc	09-Aug-05	Pharmion Corp	05-Nov-03
Eschelon Telecom Inc	04-Aug-05	Myogen Inc	29-Oct-03
Advanced Analogic Technologies Inc	03-Aug-05	DigitalNet Holdings Inc	09-Oct-03
Hittite Microwave Corp	21-Jul-05	Sigmatel Inc	18-Sep-03
Adams Respiratory Therapeutics Inc	20-Jul-05	NETGEAR Inc	30-Jul-03
Rackable Systems Inc	09-Jun-05	iPass Inc	23-Jul-03

Company name	Date	Company name	Date
FormFactor Inc	11-Jun-03	Peco II Inc	17-Aug-00
Inveresk Research Group Inc	27-Jun-02	PeoplePC Inc	15-Aug-00
Eon Labs Inc	22-May-02	Large Scale Biology Corp	09-Aug-00
PayPal Inc	14-Feb-02	Regeneration Technologies Inc	09-Aug-00
ManTech International Corp	06-Feb-02	ChipPAC Inc	08-Aug-00
ZymoGenetics Inc	31-Jan-02	Medicines Co	07-Aug-00
American Pharmaceutical Partners	13-Dec-01	Pemstar Inc	07-Aug-00
NetScreen Technologies Inc	11-Dec-01	Telecommunication Systems Inc	07-Aug-00
Lawson Software Inc	06-Dec-01	3-Dimensional Pharmaceuticals Inc	03-Aug-00
HPL Technologies Inc	30-Jul-01	Deltagen Inc	02-Aug-00
Multilink Technology Corp	20-Jun-01	iAsiaWorks Inc	02-Aug-00
Unilab Corp	05-Jun-01	Rosetta Inpharmatics Inc	02-Aug-00
Instinet Group Inc	17-May-01	Resonate Inc	02-Aug-00
Tellium Inc	16-May-01	SignalSoft Corp	02-Aug-00
Opsware Inc (LoudCloud)	08-Mar-01	Inspire Pharmaceuticals Inc	02-Aug-00
Riverstone Networks Inc	15-Feb-01	Genaissance Pharmaceuticals Inc	01-Aug-00
Third Wave Technologies Inc	09-Feb-01	Speechworks International Inc	31-Jul-00
Garmin Ltd	07-Dec-00	Western Multiplex Corp	31-Jul-00
Adolor Corp	13-Nov-00	Genencor International Inc	27-Jul-00
Luminent Inc	09-Nov-00	Arena Pharmaceuticals Inc	27-Jul-00
Optical Communication Products Inc	02-Nov-00	Lexent Inc	27-Jul-00
Ixia Communications	17-Oct-00	Applied Molecular Evolution Inc	26-Jul-00
Endwave Corp	16-Oct-00	Discovery Partners International Inc	26-Jul-00
POZEN Inc	10-Oct-00	Blue Martini Software Inc	24-Jul-00
Advanced Switching Communications Inc	04-Oct-00	Corio Inc	20-Jul-00
Kosan Biosciences Inc	04-Oct-00	SMTC Corp	20-Jul-00
InforMax Inc	02-Oct-00	Variagenics Inc	20-Jul-00
Genomica Corp	28-Sep-00	Airspan Networks Inc	19-Jul-00
Elastic Networks Inc	28-Sep-00	Argonaut Technologies Inc	18-Jul-00
Docent Inc	28-Sep-00	deCODE Genetics Inc	17-Jul-00
Vastera Inc	27-Sep-00	Transgenomic Inc	17-Jul-00
Durect Corp	27-Sep-00	Network Engines Inc	12-Jul-00
AvantGo Inc	26-Sep-00	Triton Network Systems Inc	12-Jul-00
Inrange Technologies Corp	21-Sep-00	I-many Inc	12-Jul-00
TTM Technologies Inc	20-Sep-00	Divine Inc	11-Jul-00
OmniSky Corp	20-Sep-00	Marvell Technology Group Ltd	26-Jun-00
Integrated Telecom Express Inc	17-Aug-00	UbiquiTel Inc	07-Jun-00
WJ Communications Inc	17-Aug-00	Sonus Networks Inc	24-May-00

Company name	Date	Company name	Date
Integrated Circuit Systems Inc	22-May-00	Eloquent Inc	16-Feb-00
iBeam Broadcasting Corp	17-May-00	Chordiant Software Inc	14-Feb-00
New Focus Inc	17-May-00	webMethods Inc	10-Feb-00
US Unwired Inc	17-May-00	Beasley Broadcast Group Inc	10-Feb-00
Crown Media Holdings Inc	03-May-00	Lante Corp	10-Feb-00
Praecis Pharmaceuticals Inc	26-Apr-00	Fargo Electronics Inc	10-Feb-00
Packard BioScience Co	19-Apr-00	Cypress Communications Inc	09-Feb-00
Nuance Communications Inc	12-Apr-00	Organic Inc	09-Feb-00
DDi Corp	10-Apr-00	XCarenet Inc	09-Feb-00
Exelixis Inc	10-Apr-00	Witness Systems Inc	09-Feb-00
GoAmerica Inc	06-Apr-00	Delano Technology Corp	08-Feb-00
Numerical Technologies Inc	06-Apr-00	FirePond Inc	03-Feb-00
i3 Mobile Inc	05-Apr-00	Telaxis Communications Corp	01-Feb-00
Vyyo Inc	04-Apr-00	Impsat Fiber Networks Inc	31-Jan-00
ArrowPoint Communications Inc	30-Mar-00	Sequenom Inc	31-Jan-00
Telocity Delaware Inc	28-Mar-00	Turnstone Systems Inc	31-Jan-00
IntraBiotics Pharmaceuticals Inc	27-Mar-00	Interwave Communications Intnl' Ltd	28-Jan-00
Allos Therapeutics Inc	27-Mar-00	724 Solutions Inc	27-Jan-00
InterMune Inc	23-Mar-00	Caminus Corp	27-Jan-00
Silicon Laboratories Inc	23-Mar-00	Extensity Inc	26-Jan-00
Caldera International Inc	20-Mar-00	Regent Communications Inc	24-Jan-00
Netpliance Inc	16-Mar-00	Neoforma Inc	24-Jan-00
Uproar Inc	16-Mar-00	Xpedior Inc	15-Dec-99
Loudeye Corp	14-Mar-00	Maxygen Inc	15-Dec-99
RADVision Ltd	13-Mar-00	Z-Tel Technologies Inc	14-Dec-99
Selectica Inc	09-Mar-00	VA Linux Systems Inc	09-Dec-99
OTG Software Inc	09-Mar-00	El Sitio International Corp	09-Dec-99
OraPharma Inc	08-Mar-00	MedicaLogic Inc	09-Dec-99
FirstWorld Communications Inc	07-Mar-00	eBenX Inc	09-Dec-99
AsiaInfo Holdings Inc	02-Mar-00	Agency.com Ltd	07-Dec-99
Register.com Inc	02-Mar-00	Preview Systems Inc	07-Dec-99
Versata Inc	02-Mar-00	Andover.net Inc	07-Dec-99
Onvia.com Inc	29-Feb-00	AirNet Communications Corp	06-Dec-99
MatrixOne Inc	29-Feb-00	Digimarc Corp	01-Dec-99
Avenue A Inc	28-Feb-00	McAfee.com Corp	01-Dec-99
net.Genesis Corp	28-Feb-00	OpenTV Corp(MIH Ltd)	22-Nov-99
Hotel Reservations Network Inc	24-Feb-00	Deltathree Com Inc	22-Nov-99
Apropos Technology Inc	16-Feb-00	Official Payments Corp	22-Nov-99

Company name	Date	Company name	Date
SciQuest.com Inc	19-Nov-99	Red Hat Inc	11-Aug-99
CacheFlow Inc	18-Nov-99	Internet Capital Group	04-Aug-99
Alaska Communications Systems	17-Nov-99	Interactive Pictures Corp	04-Aug-99
MetaSolv Software Inc	17-Nov-99	Digex Inc	29-Jul-99
Retek Inc	17-Nov-99	Creo Products Inc	28-Jul-99
Symyx Technologies Inc	17-Nov-99	Net2Phone Inc	28-Jul-99
Virata Corp	16-Nov-99	Focal Communications Corp	27-Jul-99
Finisar Corp	11-Nov-99	Allscripts Inc	23-Jul-99
Somera Communications Inc	11-Nov-99	JFAX Com Inc	22-Jul-99
Rudolph Technologies Inc	11-Nov-99	Voyager.net Inc	20-Jul-99
Next Level Communications Inc	09-Nov-99	Convergent Communications Inc	19-Jul-99
iBasis Inc	09-Nov-99	Engage Technologies Inc	19-Jul-99
Pac-West Telecomm Inc	03-Nov-99	Gadzoox Networks Inc	19-Jul-99
Be Free Inc	02-Nov-99	Paradyne Networks Inc	15-Jul-99
Data Return Corp	27-Oct-99	National Information Consortium Inc	14-Jul-99
InterTrust Technologies Corp	26-Oct-99	TIBCO Software Inc	13-Jul-99
JNI Corp	26-Oct-99	Interliant Inc	07-Jul-99
Predictive Systems Inc	26-Oct-99	Network Plus Corp	29-Jun-99
NaviSite Inc	21-Oct-99	Juniper Networks Inc	24-Jun-99
Aether Systems Inc	20-Oct-99	Ariba Inc	22-Jun-99
Zapme corp	19-Oct-99	Goto COM Inc (Overture Services Inc)	17-Jun-99
Crossroads Systems Inc	19-Oct-99	SBA Communications Corp	16-Jun-99
Radio Unica Corp	18-Oct-99	High Speed Access Corp	03-Jun-99
PC-Tel Inc	18-Oct-99	Network Access Solutions Corp	03-Jun-99
QuickLogic Corp	14-Oct-99	iXL Enterprises Inc	02-Jun-99
Netcentives Inc	13-Oct-99	INET Technologies Inc	26-May-99
E-Stamp Corp	08-Oct-99	Star Media Network Inc	25-May-99
XM Satellite Radio Inc	04-Oct-99	Juno Online Services Inc	25-May-99
Vixel Corp	30-Sep-99	TenFold Corp	20-May-99
ACME Communications Inc	29-Sep-99	CAIS Internet Inc	19-May-99
TiVo Inc	29-Sep-99	Copper Mountain Networks Inc	12-May-99
ShopNow.com Inc	28-Sep-99	TheStreet.com	10-May-99
Foundry Networks Inc	27-Sep-99	Radio One Inc	05-May-99
AirGate PCS Inc	27-Sep-99	Marimba Inc	29-Apr-99
ITXC Corp	27-Sep-99	AppliedTheory Corporation	29-Apr-99
NetZero Inc	23-Sep-99	Mpath Interactive Inc	28-Apr-99
Luminant Worldwide Corp	15-Sep-99	Launch Media Inc	22-Apr-99
Wink Communications Inc	18-Aug-99	WorldGate Communications Inc	15-Apr-99

Company name	Date
MIH Ltd	12-Apr-99
US Internetworking Inc	08-Apr-99
Extreme Networks Inc	08-Apr-99
iTurf Inc	08-Apr-99
Priceline.com Inc	29-Mar-99
Critical Path Inc	29-Mar-99
MKS Instruments	29-Mar-99
iVillage Inc	18-Mar-99
Vignette Corp	18-Feb-99
Serena Software Inc	11-Feb-99
Prodigy Communications Inc	10-Feb-99
Covad Communications Group Inc	21-Jan-99